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Recent and planned changes in production capacity for bauxite, alumina and aluminium

Note by the UNCTAD secretariat

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A. Introduction

1. From 1995 to 1997, the UNCTAD secretariat published notes on "Recent and planned changes in production capacity for bauxite, alumina and aluminium" (UNCTAD/COM/RDS/1 and 4 and UNCTAD/ITCD/COM/13 respectively). The notes were intended to provide a continuation of a similar service formerly provided by the secretariat of the International Bauxite Association (IBA), which ceased its activities at the end of 1994. The notes were distributed to the member Governments of UNCTAD, as well as to about 100 companies, institutions and individuals interested in the bauxite/alumina/aluminium industry. Readers were invited to comment on the usefulness and accuracy of the information. The replies received were all positive and it was decided to continue the service on a trial basis. However, recent reductions in the staff working on commodity issues in the UNCTAD secretariat have now made it impossible to devote resources to this activity. Accordingly, this note is the last of its kind to be published.

2. The present note uses the same format as the ones previously published. The bulk of the note consists of three tables showing capacity developments for bauxite, alumina and primary aluminium respectively during the period 1998 to 2003. The tables are based on information on production capacities and investment plans available to the UNCTAD secretariat, mainly from trade journals. A commentary on the tables is provided in section C below in summary form.

B. Definitions

3. With the exception of data for bauxite mines, capacity refers to nominal or "nameplate" capacity. While alumina refineries and primary aluminium smelters may from time to time exceed their nominal production capacities, sometimes for many consecutive years, an attempt to estimate "actual" or "real" capacities is likely to lead to inconsistencies and create confusion. In the case of bauxite mines, however, nominal capacity figures may not be very relevant, given the ease with which output can often be changed. Accordingly, bauxite mine production capacities refer to "real" capacity, as concluded from historical production figures. Capacities are expressed in thousand metric tons per year at the end of the year.

4. For bauxite mines, production capacity data refer to the gross weight (that is, not the aluminium or alumina content) of saleable products. It should be noted that the data may in some cases refer to dry weight (not including the moisture content of the material) rather than total weight, since it has not been possible to standardize the data. Data on a few mines producing non-bauxite raw materials used in alumina refineries have been included, although the capacity data are shown within parentheses and are not included in the totals. Production capacity data for alumina refineries refer to gross weight (not aluminium content) of saleable products. For aluminium, the data refer to primary aluminium in whatever form it is commercialized. Information on some production facilities which have closed as a result of war or civil disturbance has been included. Where it is unlikely that the production facility in question could be re-opened without a major reconstruction effort, its capacity is shown within parentheses and is not included in the totals.

5. Future additions to capacity have been included where there is a reasonably high probability of the investment taking place, for instance, because construction has started, financing has been secured or government approvals have been obtained. Clearly, information on projects which are not

planned to enter production until late in the period is less certain. For the sake of completeness, information has also been provided on some projects which are unlikely to enter into production during the period, in which case their capacity is shown as zero.

C. Summary of recent and expected developments in production capacity

6. The following table summarizes expected capacity developments from 1998 to 2003.

World production capacity for bauxite, alumina and aluminium 1998-2003 (thousand metric tons per year)

Product	Capacity in 1998	Changes		
		1999	2000	2001-2003
Bauxite	132,134	1,200	11,500	5,900
Alumina	52,466	800	2,940	3,582
Primary aluminium	24,437	395	555	1,854

1. Bauxite

7. World bauxite capacity is estimated to have increased by 1.2 million tons in 1999. The only capacity expansions took place in Latin America, where the Lelydorp mine in Surinam increased capacity by 1 million tons, and capacity at Bauxilum in Venezuela grew by 200,000 tons per year.

8. In the year 2000, production capacity is expected to increase by 11.5 million tons. Most of the increase is accounted for by the Huntly mine in Australia, where capacity is planned to rise by 6.1 million tons, replacing capacity at the Jarrahdale mine, which was closed at the end of 1998. Also in Australia, the Ely mine with a capacity of 2.5 million tons will open. Expansions will also take place at the Boke/Sangaredi mine in Guinea and at the MRN mine at Trombetas in Brazil.

9. Over the period from 2001 until the end of 2003, world bauxite production capacity is expected to increase by 5.9 million tons. India accounts for about half the expansion with capacity at the Panchpatmali mine expected to increase by 2.4 million tons. Other new mines are at the planning stage in India, particularly in the state of Orissa, where several integrated bauxite/alumina/aluminium operations are being planned, but it is uncertain if any of them will enter production during the period. Expansions are also expected at Weipa in Australia and at Bauxilum in Venezuela. It is also likely that there will be some expansion of bauxite production capacity in China, although no details are known.

2. Alumina

10. World alumina refining capacity is estimated to have increased by 800,000 tons in 1999, or by 1.5 per cent. The expansion of the Wagerup refinery in Australia accounts for more than half of this, or 500,000 tons, with the rest being made up by a smaller extension at Alunorte in Brazil.

11. In 2000, production capacity for alumina is expected to increase by 2.9 million tons. Again, Australia accounts for most of the increase, with a large expansion at Worsley and a smaller one at the Gove refinery. A relatively large expansion is expected to take place at the Damanjodi refinery in India, several smaller expansions are planned in China and a small expansion will take place in Italy.

12. During the period 2001-2003, alumina capacity is expected to increase by almost 3.6 million tons. One new alumina refinery is expected to enter into production in India. The largest expansions of existing capacity, 1 million tons and 820,000 tons respectively, are planned at Bauxilum in Venezuela and at Alunorte in Brazil. Smaller capacity increases will take place in Australia, China, Guinea, India, and Spain.

3. Aluminium

13. In late 1999, a little more than 900,000 tons of primary aluminium smelter capacity, representing 3.7 per cent of world capacity, was temporarily closed due to the market situation. While some of the capacity previously taken out of production was brought back into operation in 1998 and 1999, new cutbacks were introduced at a couple of smelters and market conditions have kept a large proportion of the smelters concerned from re-opening. Consequently, the net addition to production from this source was only about 100,000 tons during the last two years. Most of the continued cutbacks, or about 70 per cent, concerned smelters in the United States. Since information about the status of cutbacks is not available in some cases, the figures are uncertain. Moreover, several smelters, mainly in the other republics of the former USSR and in the countries formerly constituting Yugoslavia, operated at reduced capacity or were shut down due to war, civil unrest or technical problems. Total capacity was about 25.2 million tons at the end of 1999, and it is estimated that total production in the year will be about 22.7 million tons, or about 3.5 per cent more than in 1998.

14. World production capacity is estimated to have increased by 395,000 tons in 1999, or by 1.6 per cent. The Isle Maligne smelter in Canada was closed down, as was Alcoa's Suralco smelter in Surinam. The largest expansion took place in the United Arab Emirates, where capacity at the Dubai aluminium smelter was increased by 146,000 tons. Smaller increases in capacity were undertaken in Argentina, Canada, China, India, the Russian Federation and the United States.

15. In the year 2000, aluminium production capacity is expected to increase by 555,000 tons. The only new smelter is the Alma smelter in Canada, which will open in the second haldf of the year, while the Belgaum smelter in India is planned to close. Minor capacity expansions are expected in Canada, China, India, the Russian Federation and the United States.

16. During the years 2001 to 2003, production capacity is expected to increase by almost 1.9 million tons. Of this, about 740,000 tons would be added through expansions of existing smelters in Brazil, China, India, the Russian Federation, Spain and Slovakia, with the largest expansions taking place in China and the Russian Federation. Five new smelter projects with a combined capacity of 1,130,000 tons are reasonably certain to be implemented: in Australia (400,000 tons), China (two smelters with a combined capacity of 355,000 tons), India (125,000 tons) and Mozambique (250,000 tons). One smelter, at Steg in Switzerland (18,000 tons), which was going to close in 1999, is likely to remain open until 2001.

D. Market outlook

17. Aluminium stocks are believed to have been roughly unchanged in both 1998 and 1999. While producers' inventories of unwrought aluminium as reported by the International Primary Aluminum Institute decreased by about 150,000 tons during the first nine months of 1999, this decrease was offset by an increase of 160,000 tons in London Metal Exchange (LME) stocks during the same period. It should be noted, however, that it is estimated that significant amounts of inventories are unreported and that in 1998, total stocks may have increased as a result. At the end of 1999, it appears that production and consumption rates are more or less in balance. Prices decreased in 1998, with the average monthly price falling from US$ 1,485.80 per ton in January to US$ 1,249.10 in December. Expectations of falling demand due to the Asian financial crisis were among the main reasons for the price fall. These expectations turned out to be somewhat exaggerated, since consumption increased by 2 to 2.5 per cent during the year. In 1999, a return of business confidence and relatively robust demand growth led to an increase in prices, particularly during the second half of the year. In December, spot prices on the LME were over US$ 1,500 per ton. The potential for rapid re-opening of the closed-down capacity may preclude any major increases in prices in the year 2000, in spite of positive economic growth forecasts and stocks being close to the level desired for operations. For the longer period stretching from 2000 to 2003, however, assuming that primary aluminium consumption increases at a rate close to the historical average, that is, an annual rate of between 2.5 and 3.5 per cent, anticipated capacity increases of 2 million tons may not be sufficient to meet demand. Accordingly, temporarily closed down capacity is likely to be brought back into operation and, even assuming that this happens, a price peak may occur in 2001 or 2002, depending on the exact timing of capacity additions.

18. During 1999, two major mergers were announced in the aluminum industry. In August, Alcan, Algroup (formerly Alusuisse) and Pechiney announced a planned merger of the three companies. Shortly thereafter, Alcoa announced plans to take over Reynolds. Subsequently, in March 2000, plans for the first merger was cancelled. The outcome of the merger plans between Alcoa and Reynolds depends on anti-trust rulings by the authorities of the United States and the European Union. The rulings were expected in mid-May. The trend towards increased concentration illustrated by the merger attempts could have implications for market behaviour in the future. In particular, the tendency for prices to fluctuate by large amounts, which in the view of many industry observers is partly due to the reluctance of the industry to cut output sufficiently or rapidly enough in times of low prices, may be significantly reduced if industry concentration were to increase.

19. Prices for alumina declined slightly in 1998, but began a modest recovery in the first half of 1999 as the projected surplus of production over demand shrank. Following the explosion at the Gramercy refinery in the United States on 5 July, which led to a loss of 2 per cent of world alumina production capacity, prices increased dramatically. On the spot market, prices nearly doubled from about US$ 150 per ton to US$ 280, while price clauses in long-term contracts increased from about 12 per cent of the aluminum prices to 15 per cent. Planned capacity expansions in the year 2000 should be sufficient to meet additional demand, but the possibility of alumina availability becoming a constraint on aluminium production can not be totally excluded, since the Gramercy refinery is not likely to be back in operation until shortly before the end of the year. Over the longer term, it is likely that more capacity than has been identified in the table in the annex will need to be added and that previously cancelled or delayed projects will be resurrected.

20. Bauxite capacity and production are expected to grow at rates sufficient to meet the requirements of alumina refineries, in particular since major additions to capacity are expected to take place in the year 2000 as well as in later years.

Table 1. Bauxite mine capacity 1998-2003
(thousand metric tons per year)

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Developed countries							
North America							
United States of America							
C-E Minerals	Eufaula, Alabama	NMG	100	100	100	100	
	Andersonville, Georgia	NMG	20	20	20	20	
Cytec Industries	Andersonville, Georgia	NMG	150	150	150	150	
Harrison-Walker Refractories	Eufaula, Alabama	NMG	100	100	100	100	
Total United States, North America		**NMG**	**370**	**370**	**370**	**370**	
Europe							
Western Europe							
France							
Garrot Chaillac	Bedarieux, Hérault	NMG	200	200	200	200	
Greece							
Bauxite Delphon	Delphi	MG	600	600	600	600	
Bauxite Hell. Distomon	Distomon	MG	310	310	310	310	
Bauxite Parnasse	Delphi	MG	800	800	800	800	
		NMG	400	400	400	400	

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Eleusis Bauxite	Eleusis	MG	120	120	120	120	
Total Greece		**MG**	**1830**	**1830**	**1830**	**1830**	
		NMG	**400**	**400**	**400**	**400**	
Italy							
Sarda Bauxiti	Olovedo, Sardinia	MG	350	350	350	350	
Total Western Europe		**MG**	**2180**	**2180**	**2180**	**2180**	
		NMG	**600**	**600**	**600**	**600**	
Eastern Europe							
Hungary							
Bakonyi Bauxitbanya Kft.	Bakonyi	MG	1500	1500	1500	1500	Producing at reduced rate (500-1000 ktpy) due to closures of customer refineries (Metal Bulletin, 3 March 1997, p. 5)
Romania							
State	Rosia	MG	500	500	500	500	
Russian Federation							
	Severo-Uralsk	MG	3200	3200	3200	3200	
	Yuzhno-Uralsk	MG	500	500	500	500	
	Severo-Onezhsky	MG	1000	1000	1000	1000	
	Kola Peninsula, nepheline	MG	(1500)	(1500)	(1500)	(1500)	Bauxite equival.=825,000 tons
	Caucasus, alunite	MG	(4200)	(4200)	(4200)	(4200)	Bauxite equival.=2,310,000 tons
Total Russian Federation		**MG**	**4700**	**4700**	**4700**	**4700**	
Total Eastern Europe		**MG**	**6700**	**6700**	**6700**	**6700**	

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Australia							
Alcan	Ely, Queensland	MG	0	0	2500	2500	
Alcoa World Alumina (Alcoa 60 %,	Del Park	MG	6000	6000	6000	6000	
Western Mining Corporation 40 %)	Huntly	MG	11900	11900	18000	18000	
	Willowdale	MG	6100	6100	6100	6100	
Comalco	Weipa	MG	11050	11050	11050	13550	
		NMG	250	250	250	250	
Nabalco Pty. Ltd.	Gove	MG	6750	6750	6750	6750	
		NMG	250	250	250	250	
Worsley Alumina Pty. Ltd.	Mt. Saddleback	MG	7000	7000	7000	7000	
Total Australia		**MG**	**48800**	**48800**	**57400**	**59900**	
		NMG	**500**	**500**	**500**	**500**	
Total developed countries		**MG**	**57680**	**57680**	**66280**	**68780**	
		NMG	**1470**	**1470**	**1470**	**1470**	
Developing countries							
America							
Brazil							
Alcan	Ouro Preto	MG	485	485	485	485	
Alcoa	Poços de Caldas	MG	750	750	750	750	
CBA	Poços de Caldas	MG	600	600	600	600	
	Cataguazes	MG	500	500	500	500	
Cia. Brasileira de Bauxita	Paragomina, Pará	NMG	20	20	20	20	
CVRD/Paraibuna	North Pará	NMG	100	100	100	100	

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Finapa	Bahia	NMG	140	140	140	140	
Mineração Curimbaba Ltda.	Poços de Caldas	NMG	244	244	244	244	
MRN	Trombetas	MG	9600	9600	10000	10000	May be expanded to 13.5 Mtpy (Metal Bulletin, 12 July 1999, p. 3)
MSL Minerais SA	Caracuru, Pará	NMG	200	200	200	200	
Total Brazil		**MG**	**11935**	**11935**	**12335**	**12335**	
		NMG	**704**	**704**	**704**	**704**	
Guyana							
Bermine	Berbice/Mackenzie	MG	150	150	150	150	
		NMG	150	150	150	150	
Linmine/Alcan	Linden	NMG	200	200	200	200	
Reynolds/Bidco	Aroaima	MG	1500	1500	1500	1500	
Total Guyana		**MG**	**1650**	**1650**	**1650**	**1650**	
		NMG	**350**	**350**	**350**	**350**	
Jamaica							
Alpart	Nain	MG	3600	3600	3600	3600	
Jamalcan	Schwallenburg	MG	1300	1300	1300	1300	
	Kirkvine	MG	1300	1300	1300	1300	
Jamalco	Mocho Mountain	MG	2000	2000	2000	2000	
Kaiser Jamaica Bauxite Co.	St. Ann/Discovery Bay	MG	4000	4000	4000	4000	
Total Jamaica		**MG**	**12200**	**12200**	**12200**	**12200**	
Suriname							
Gencor/Alcoa	Lelydorp	MG	1000	2000	2000	2000	
Alcoa	Coirmotibo	MG	2000	2000	2000	2000	
Total Suriname		**MG**	**3000**	**4000**	**4000**	**4000**	

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Venezuela							
Bauxilum	Los Pijiguaos	MG	5800	6000	6000	7000	Privatization planned for 2000 (Metal Bulletin, 23 September 1999, p. 11)
Total America		**MG**	**34585**	**35785**	**36185**	**37185**	
		NMG	**1054**	**1054**	**1054**	**1054**	
Africa							
Ghana							
Ghana Bauxite	Awaso	MG	400	400	400	400	
Guinea							
CBG	Boke/Sanagaredi	MG	12000	12000	13500	13500	
		NMG	150	150	150	150	
Friguia	Fria-Kimbo	MG	2150	2150	2150	2150	To be privatized (Metal Bulletin, 22 February 1999, p. 14)
OBK	Kindia	MG	3000	3000	3000	3000	
Total Guinea		**MG**	**17150**	**17150**	**18650**	**18650**	
		NMG	**150**	**150**	**150**	**150**	
Mozambique							
E.C. Meikle Plc.	Manica	NMG	10	10	10	10	
Sierra Leone							
Sierra Leone Ore & Metal Co.	Mokanji-Gondama	MG	1200	1200	1200	1200	Closed in January 1995 (Mining Journal, 30 May 1997, p. 427)
Total Africa		**MG**	**18750**	**18750**	**20250**	**20250**	
		NMG	**160**	**160**	**160**	**160**	

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Asia							
Azerbaijan							
Zaglik Alunite Mining Dir.	Zaglik, alunite	MG	(500)	(500)	(500)	(500)	Bauxite equivalent=170,000 tons
China							
National Nonferrous Metals Bureau and provincial governments	various	MG	5500	5500	6500	6500	
		NMG	750	750	750	750	
India							
Bharat Aluminium Co.	Mainper, Madhya Pradesh	MG	400	400	400	400	
	Bhuj	NMG	100	100	100	100	
Gimpex Minerals	Renukoot, Uttar Pradesh	MG	600	600	600	600	
Gujarat Mineral Development Corp.	Kutch/Saurashtra, Gujarat	NMG	500	500	500	500	
Hindustan Aluminium Co.	Lohardfaga, Bihar	MG	225	225	225	225	
Indian Aluminium Co.	Kolhapur, Maharashtra	MG	480	480	480	480	
	Belgaum, Karnataka	MG	400	400	400	400	
	Ranmchi, Bihar	MG	200	200	200	200	
Madras Aluminium Co.	Mettur, Tamil Nadu	NMG	100	100	100	100	
National Aluminium Co.	Panchpatmali	MG	2400	2400	2400	4800	Expansion project progressing (Metal Bulletin, 5 October 1999, p. 9)
Prabhudas	Jamnagar	NMG	30	30	30	30	
Total India		**MG**	**4705**	**4705**	**4705**	**7105**	
		NMG	**730**	**730**	**730**	**730**	

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Indonesia							
Aneka Tambang	Bintan	MG	0	0	0	0	Mine closed 1998, previous capacity 1300 ktpy (Mining Journal, 17 July 1998, p. 41)
Iran (Islamic Reublic of)							
State	Jajrum	MG	100	100	100	100	
Kazakhstan							
State	Turgay	MG	1300	1300	1300	1300	
	Krasnooktyabrsk	MG	1700	1700	1700	1700	
Total Kazakhstan		**MG**	**3000**	**3000**	**3000**	**3000**	
Malaysia							
Johore Mining and Stevedoring Co.	Bukit Pasat, Johore	MG	800	800	800	800	
		NMG	200	200	200	200	
Turkey							
Etibank	Seydisehir/Bolkardag	MG	400	400	400	400	
		NMG	200	200	200	200	
Total Asia		**MG**	**14505**	**14505**	**15505**	**17905**	
		NMG	**1880**	**1880**	**1880**	**1880**	

Country/company	Location	Bauxite type[a]	Capacity 1998	1999	2000	2003	Comments
Europe							
Bosnia and Herzegovina							
Energoinvest	Vlasenica	MG	1000	1000	1000	1000	
Croatia							
Pomgrad	Imotski	MG	50	50	50	50	
Yugoslavia							
Kombinat Aluminijum Titograd-Niksic	Niksic	MG	1000	1000	1000	1000	
Total Europe		**MG**	**2050**	**2050**	**2050**	**2050**	
Total developing countries		**MG**	**69890**	**71090**	**73990**	**77390**	
		NMG	**3094**	**3094**	**3094**	**3094**	
Total world		**MG**	**127570**	**128770**	**140270**	**146170**	
		NMG	**4564**	**4564**	**4564**	**4564**	

Sources: Trade journals

[a] MG=Metallurgical grade; NMG=Non-metallurgical grade.

Table 2. Alumina refinery capacity 1998-2003
(thousand metric tons per year)

Country/company	Location	Alumina type[a]	Capacity 1998	1999	2000	2003	Comments
Developed countries							
North America							
Canada							
Alcan	Vaudreuil, Québec	MG	1075	1075	1075	1075	
		NMG	100	100	100	100	
United States of America							
Alcoa	Point Comfort, Texas	MG	1450	1450	1450	1450	
		NMG	340	340	340	340	
	St. Croix, U.S. Virgin Islands	MG	600	600	600	600	
Kaiser	Gramercy, Lousiana	MG	1000	1000	1000	1000	Closed down due to explosion in July 1999, to be back in operation at end 2000 (Metal Bulletin, 26 July 1999, p. 4)
		NMG	200	200	200	200	
Ormet	Burnside, Louisiana	MG	600	600	600	600	
Reynolds	Corpus Christi, Texas	MG	1600	1600	1600	1600	
		NMG	200	200	200	200	
Total United States of America		**MG**	**5250**	**5250**	**5250**	**5250**	
		NMG	**740**	**740**	**740**	**740**	
Total North America		**MG**	**6325**	**6325**	**6325**	**6325**	
		NMG	**840**	**840**	**840**	**840**	
Europe							
Western Europe							
France							
Pechiney	Gardanne	MG	410	410	410	410	
		NMG	300	300	300	300	

Country/company	Location	Alumina type[a]	Capacity 1998	1999	2000	2003	Comments
Germany							
Aluminium-Oxid Stade	Stade	MG	670	670	670	670	
Elektrochemisches Kombinat	Lauta	NMG	60	60	60	60	
Lonza-Werke	Bergheim	MG	100	100	100	100	
		NMG	250	250	250	250	
Total Germany		**MG**	**770**	**770**	**770**	**770**	
		NMG	**310**	**310**	**310**	**310**	
Greece							
Aluminium de Grèce	Distomon	MG	640	640	640	640	
Ireland							
Aughinish Alumina Ltd.	Aughinish	MG	1100	1100	1100	1100	Sold by Alcan to Glencore (Metal Bulletin, 25 January 1999, p. 7)
Italy							
Eurallumina Spa.	Porto Vesme	MG	920	920	970	970	(Metal Bulletin, 11 February 1999, p. 4)
		NMG	30	30	30	30	
Spain							
Alcoa	San Ciprian	MG	1000	1000	1000	1100	
United Kingdom							
Alcan	Burntisland, Scotland	NMG	120	120	120	120	
Total Western Europe		**MG**	**4840**	**4840**	**4890**	**4990**	
		NMG	**760**	**760**	**760**	**760**	

Country/company	Location	Alumina type[a]	Capacity 1998	1999	2000	2003	Comments
Eastern Europe							
Hungary							
Altus-GPS	Motim	NMG	75	75	75	75	
Magyar Aluminium	Ajka	MG	300	300	300	300	Operating at a rate of 210 ktpy in 1998 (Metal Bulletin, 26 October 1998, p. 11)
	Almásfüzitõ	MG	350	350	350	350	Closed in November 1994, re-opened in December 1995, privatized in late 1996, closed down in early 1997, uncertain if it will re-open (Metal Bulletin, 24 March 1997, p. 5)
Total Hungary		**MG**	**650**	**650**	**650**	**650**	
		NMG	**75**	**75**	**75**	**75**	
Romania							
Balli Metal	Tulcea	MG	400	400	400	600	
State	Crisana	MG	250	250	250	250	
Total Romania		**MG**	**650**	**650**	**650**	**650**	
Russian Federation							
Achinsk Alumina	Achinsk	MG	900	900	900	900	
Pikalevo Alumina	Pikalevo	MG	260	260	260	260	
Tikhvin Alumina	Boksitogorsk	MG	200	200	200	200	
Ural Aluminium Co.	Bogoslovsk	MG	950	950	950	950	
Ural Aluminium Co.	Kamensk	MG	500	500	500	500	
Volkhov Aluminium	Volkhov	MG	40	40	40	40	
Total Russian Federation		**MG**	**2850**	**2850**	**2850**	**2850**	
Slovakia							
ZSNP	Ziar-nad-Hronom	MG	65	65	65	65	
Ukraine							
Nikolaev Alumina	Nikolaev	MG	1000	1000	1000	1000	

Country/company	Location	Alumina type[a]	Capacity 1998	1999	2000	2003	Comments
Total Eastern Europe		**MG**	**5215**	**5215**	**5215**	**5215**	
		NMG	**75**	**75**	**75**	**75**	
Australia							
Alcoa World Alumina (Alcoa 60%, Western	Kwinana	MG	1900	1900	1900	1900	
		NMG	200	200	200	200	
Mining Corporation 40 %)	Pinjarra	MG	3100	3100	3100	3100	
	Wagerup	MG	1700	2200	2200	2200	Expansion to 3.3 Mtpy considered (Metal Bulletin, 14 October 1999, p. 6)
Australia Fused Material	Doral	NMG	20	20	20	30	
Nabalco Pty. Ltd.	Gove	MG	1750	1750	2000	2000	Capacity increase to be completed by 2001 (Metal Bulletin, 10 June 1999, p. 4)
Queensland Alumina Ltd.	Gladstone	MG	3300	3300	3300	3600	
Worsley Alumina Pty. Ltd.	Worsley	MG	1700	1700	3100	3100	
Comalco	Queensland	**MG**	0	0	0	0	Completion date of project uncertain (Metal Bulletin, 24 February 1998)
Total Australia		**MG**	**13450**	**13950**	**15600**	**15900**	
		NMG	**220**	**220**	**220**	**230**	
Japan							
Nippon Light Metal	Shimizu	MG	215	215	215	215	
		NMG	200	200	200	200	
Showa Light Metal	Yokohama	NMG	275	275	275	275	
Sumitomo Chemical	Kikumoto	NMG	220	220	220	220	
Total Japan		**MG**	**215**	**215**	**215**	**215**	
		NMG	**695**	**695**	**695**	**695**	
Total developed countries		**MG**	**30045**	**30545**	**32245**	**32645**	
		NMG	**2590**	**2590**	**2590**	**2600**	

Country/company	Location	Alumina type[a]	1998	1999	2000	2003	Comments
Developing countries							
America							
Brazil							
Alcan	Saramenha	MG	150	150	150	150	
Alcoa	Poços de Caldas	MG	180	180	180	180	
		NMG	170	170	170	170	
Alumar	São Luis	MG	1400	1400	1400	1400	
Alunorte	Belem	MG	1200	1500	1500	2320	Expansion to be completed in 2001 (Metal Bulletin, 12 July 1999, p. 3)
C B A	Mairinque	MG	440	440	440	440	
Total Brazil		**MG**	**3370**	**3670**	**3670**	**4490**	
		NMG	**170**	**170**	**170**	**170**	
Jamaica							
Alpart	Nain	MG	1450	1450	1450	1450	
Jamalcan	Ewarton	MG	560	560	560	560	
	Kirkvine	MG	548	548	548	548	
		NMG	15	15	15	15	
Jamalco	Woodside	MG	800	800	800	800	
Total Jamaica		**MG**	**3358**	**3358**	**3358**	**3358**	
		NMG	**15**	**15**	**15**	**15**	
Suriname							
Billiton/Alcoa	Paranam	MG	1530	1530	1530	1530	
		NMG	120	120	120	120	
Venezuela							
Bauxilum	Mantanzas	MG	2000	2000	2000	3000	Privatization planned for 2000 (Metal Bulletin, 23 September 1999, p. 11)
Total America		**MG**	**10258**	**10558**	**10558**	**12378**	

Country/company	Location	NMG Alumina type[a]	305 Capacity 1998	305 Capacity 1999	305 Capacity 2000	305 Capacity 2003	Comments
Africa							
Guinea							
Friguia	Fria	MG	640	640	640	720	Capacitzy to be expanded over four years (Metal Bulletin, 25 March 1999, p. 3), Reynolds to buy 100 per cent (Metal Bulletin, 29 July 1999, p. 4)
Asia							
Azerbaijan							
Gyandzha Alumina Association (formerly Kirovabad Aluminium)	Gyandzha	MG	400	400	400	400	Production came to a halt in 1997 due to financial and energy supply problems, production during the year was about 10,000 tons (Platt's Metals Week, 27 October 1997, p. 6)
China							
China Great Wall	Zhengzhou	MG	800	800	930	1000	(Platt's Metals Week, 11 January 1999, p. 14)
Aluminium Corp.	Zhongzhou	MG	200	200	200	600	
Nonferrous Metals	Guiyang, Guizhou	MG	400	400	500	500	(Metal Bulletin, 4 October 1999, p. 7)
Industry Bureau and	Heijin, Shanxi	MG	1200	1200	1200	1200	
provincial governments	Nanning, Shandong	MG	560	560	560	650	
China Aluminium Corp.	Pingguo, Guanxi Zhuang	MG	330	330	660	660	Capacity may eventually reach 1 Mtpy (Metal Bulletin, 19 August 1999, p. 5)
	About 150 producers	NMG	300	300	300	300	
Total China		**MG**	**3490**	**3490**	**4050**	**4610**	
		NMG	**300**	**300**	**300**	**300**	
India							
Bharat Aluminium Co.	Korba, Madhya Pradesh	MG	200	200	200	200	
Hindustan Aluminium Co.	Renukoot, Uttar Pradesh	MG	450	450	450	450	
Indian Aluminium Co.	Belgaum, Karnataka	MG	318	318	318	510	(Metal Bulletin, 23 September 1999, p. 6)
Indian Aluminium Co.	Muri, Bihar	MG	80	80	80	100	Further expansion to a total of 200 ktpy considered (Metal Bulletin, 23 September 1999, p. 6)
		NMG	40	40	40	40	

Country/company	Location	Alumina type[a]	Capacity 1998	1999	2000	2003	Comments
Madras Aluminium Co.	Mettur, Tamil Nadu	MG	60	60	60	60	
National Aluminium Co.	Damanjodi, Orissa	MG	900	900	1580	1580	Expansion to be completed in second hald of 2000 (Metal Bulletin, 26 July 1999, p.9)
Sterlite Industries Ltd.	Ib Valley, Orissa	MG	0	0	0	500	Integrated project, to be completed inlate 2001 (Metal Bulletin, 28 September 1999, p. 9)
Total India		**MG**	**2008**	**2008**	**2688**	**3400**	
		NMG	**40**	**40**	**40**	**40**	
Iran (Islamic Republic of)							
State	Jajrum	MG	50	50	50	50	
Kazakhstan							
Pavlodar Aluminium	Pavlodar	MG	1100	1100	1100	1100	
Turkey							
Etibank	Seydisehir	MG	200	200	200	200	
Total Asia		**MG**	**7248**	**7248**	**8488**	**9760**	
		NMG	**340**	**340**	**340**	**340**	
Europe							
Bosnia and Herzegovina							
Energoinvest	Zvornik/Birac	MG	600	600	600	600	
Slovenia							
UNIAL	Kidricevo	MG	110	110	110	110	
Yugoslavia							
Kombinat Aluminijum Titograd-Niksic	Podgorica	MG	280	280	280	280	Managed by Glencore (Platt's Metals Week, 28 December 1998, p. 12)
		NMG	50	50	50	50	
Total Europe		**MG**	**990**	**990**	**990**	**990**	

		NMG	50	50	50	50	
Country/company	**Location**	**Alumina type[a]**	**Capacity 1998**	**1999**	**2000**	**2003**	**Comments**
Total developing countries		**MG**	**19136**	**19436**	**20676**	**23848**	
		NMG	**695**	**695**	**695**	**695**	
Total world		**MG**	**49181**	**49981**	**52921**	**56493**	
		NMG	**3285**	**3285**	**3285**	**3295**	

Sources: Trade journals

[a] MG=Metallurgical grade; NMG=Non-metallurgical grade

Table 3. Primary aluminium smelter capacity 1998-2003
(thousand metric tons per year)

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Developed countries							
North America							
Canada							
Alcan	Arvida, Québec	1926	235	235	235	235	
	Beauharnois, Québec	1943	49	49	49	49	
	Grande Baie, Québec	1980	186	186	196	196	Capacity to be increased by a total of 20-25 ktpy at Grande Baie and Laterrière (Metal Bulletin, 28 September 1999, p. 9)
	Isle Maligne, Québec	1943	76	0	0	0	To be closed December 1999 (Metal Bulletin, 27 September 1999, p. 6)
	Kitimat, British Columbia	1954	275	275	275	275	
	Shawinigan, Québec	1900	87	87	87	87	
	Laterriere, Québec	1990	204	204	219	219	Capacity to be increased by a total of 20-25 ktpy at Grande Baie and Laterrière (Metal Bulletin, 28 September 1999, p. 9)
	Alma, Québec	1999	0	0	375	375	To open in September 2000 (Metal Bulletin, 21 October 1999, p. 11)
Alumax	Deschambault, Québec	1992	215	225	225	225	
Aluminerie Alouette	Sept Iles, Québec	1992	229	229	229	229	
Aluminerie de Becancour	Becancour, Québec	1986	360	379	379	379	Capacity has been increased gradually (Metal Bulletin, 16 September 1999, p. 13)
Reynolds	Baie Comeau, Québec	1957	400	410	410	410	
Total Canada			**2316**	**2279**	**2679**	**2679**	
United States of America							
Alcan	Sebree, Kentucky	1973	180	180	180	180	60 ktpy shut down in 1994, no plans for restart (Metal Bulletin, 19 October 1998, p. 8), expansion by 60 ktpy possible (Platt's Metals Week, 9 November 1998, p. 13)
Alcoa	Alcoa, Tennessee	1914	210	210	210	210	53 ktpy shut down (Light Metal Age, February 1997, p. 8)
	Badin, North Carolina	1916	115	115	115	115	56 ktpy shut down (Light Metal Age, February 1997, p. 8)
	Frederick, Maryland	1970	174	174	174	174	30 ktpy cut back (Platt's Metals Week, 9 November 1998, p. 12)

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
	Massena, New York	1903	125	125	125	125	
	Rockdale, Texas	1952	315	315	315	315	143 ktpy shut down (Light Metal Age, February 1997, p. 8)
	Warrick, Indiana	1960	300	300	300	300	44 ktpy shut down, no plans for restart (Metal Bulletin, 4 August 1997, p. 14)
	Wenatchee, Washington	1952	220	220	220	220	114 ktpy shut down (Light Metal Age, February 1997, p. 8)
Alumax	Mt. Holly, South Carolina	1980	200	200	200	200	
(Intalco)	Ferndale, Washington	1966	280	280	280	280	
Glencore	Ravenswood, West Virgina	1957	168	168	168	168	
	Columbia Falls, Montana	1955	168	168	168	168	
Kaiser	Mead, Washington	1942	210	210	210	210	
	Tacoma, Washington	1942	74	74	74	74	20 ktpy shut down following strike in 1998 (Platt's Metals Week, 8 February 1999, p. 12)
Noranda	New Madrid, Missouri	1971	220	220	220	220	22 ktpy shut down (Light Metal Age, February 1997, p. 8)
Northwest Aluminium	The Dalles, Oregon	1958	83	83	83	83	5.4 ktpy shut down (Light Metal Age, February 1997, p. 8)
	Goldendale, Washington	1971	168	168	200	200	Capacity expansion expected to be completed in 2000 (Platt's Metals Week, 12 October 1998, p. 12)
Ohio River Associates	Hannibal, Ohio	1958	250	250	250	250	
Reynolds	Longview, Washington	1941	204	204	204	204	47 ktpy shut down, no plans for restart (Metal Bulletin, 26 February 1996)
	Massena, New York	1953	123	133	133	133	(Metal Bulletin, 17 May 1999, p. 6)
	Troutdale, Oregon	1942	121	121	121	121	
Southwire	Hawesville, Kentucky	1969	186	235	235	235	Expansion completed in 1999, Southwire planning to sell smelter (Metal Bulletin, 29 April 1999, p. 4)
Vanalco	Vancouver, Washington	1940	116	116	116	116	28.75 ktpy shut down (Light Metal Age, February 1997, p. 8)
Total United States of America			**4210**	**4269**	**4301**	**4301**	
Total North America			**6526**	**6548**	**6980**	**6980**	
Western Europe							
France							
Pechiney	Auzat	1910	44	44	44	44	Re-started in 1999 (Platt's Metals Week, 25 January 1999, p. 5)
	Dunkerque	1994	215	215	215	215	

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
	Lannemezan	1939	45	45	45	45	Previously closed capacity re-started in 1999 (Platt's Metals Week, 25 January 1999, p. 5)
	St. Jean de Maurienne	1986	125	125	125	125	
Total France			**429**	**429**	**429**	**429**	
Germany							
Aluminium Essen GmbH	Essen	1970	135	135	135	135	45 ktpy shut down (Light Metal Age, February 1997, p. 9)
Hamburger Aluminium	Hamburg	1973	125	125	125	125	4 ktpy shut down (Light Metal Age, February 1997, p. 9)
Hoogovens Aluminium	Voerde	1972	80	80	80	80	
Vereinigte	Norf (Rheinwerk)	1963	210	210	210	210	
Aluminiumwerke (VAW)	Stade (Elbwerk)	1973	70	70	70	70	
Total Germany			**620**	**620**	**620**	**620**	
Greece							
Aluminium de Grece	Distomon	1966	153	153	153	153	
Iceland							
Isal	Straumsvik	1969	166	166	166	166	
Columbia Ventures Corp.			60	60	60	60	Smelter started up in 1998, capacity expansion to 90 ktpy is anticipated (Metal Bulletin, 18 February 1999, p. 7)
Total Iceland			**226**	**226**	**226**	**226**	
Italy							
Alcoa	Fusina	1971	40	40	40	40	
	Porto Vesme	1972	135	135	135	135	
Total Italy			**175**	**175**	**175**	**175**	
Netherlands							
Aluminium Delfzijl	Delfzijl	1966	98	98	98	98	
Pechiney	Vlissingen	1971	175	175	175	175	
Total Netherlands			**273**	**273**	**273**	**273**	

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Norway							
Hydro Aluminium	Årdal	1946	197	197	197	197	
	Høyanger	1915	71	71	71	71	
	Karmøy	1967	267	267	267	267	
	Sunndalsøra	1954	140	140	140	140	
Mosjøen Aluminium	Lista	1971	90	90	90	90	10 ktpy shut down (Light Metal Age, February 1997, p. 9)
	Mosjøen	1958	120	120	120	120	
Sør Norge Aluminium	Husnes	1965	110	110	110	110	
Total Norway			**995**	**995**	**995**	**995**	
Spain							
Alcoa	San Ciprian	1979	200	200	200	222	Upgrading project will increase capacity through raised efficiency (Metal Bulletin, 15 September 1997, p. 15)
	La Coruña	1961	79	79	79	79	
	Aviles	1959	83	83	83	83	
Total Spain			**362**	**362**	**362**	**384**	
Sweden							
Gränges Aluminium	Sundsvall	1943	100	100	100	100	
Switzerland							
Alusuisse	Steg	1962	18	18	18	0	Smelter was to be closed at end of 1999, extended to 2001 (Metal Bulletin, 4 March 1999, p.7)
United Kingdom							
Alcan	Kinlochleven	1907	11	11	11	11	
	Lochabar	1982	40	40	40	40	
	Lynemouth	1972	140	140	140	140	75.5 ktpy shut down since 1991, no plans for restart (Platt's Metals Week, 20 October 1997, p. 15)
	Invergordon		0	0	0	0	Closed since 1982, re-opening has been discussed.

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Anglesey Aluminium	Holyhead	1971	128	128	128	128	
Total United Kingdom			**319**	**319**	**319**	**319**	
Total Western Europe			**3670**	**3670**	**3670**	**3674**	
Eastern Europe							
Hungary							
Magyar Aluminium	Inota	1950	34	34	34	34	
Poland							
Impex Metal	Konin	1965	50	50	50	50	
Romania							
Alro Slatina	Slatina	1964	170	170	170	170	To be privatized (Metal Bulletin, 1 July 1999, p. 4)
Russian Federation							
Kandalakshii Aluminium	Kandalaksha	1951	70	70	70	70	
Krasnoyarsk Aluminium	Krasnoyarsk	1964	810	830	830	830	(Metal Bulletin, 25 February 1999, p. 6)
Nadvoitsy Aluminium	Nadvoitsy	1954	70	70	70	70	
Sibir-Urals Aluminium	Bogoslovsk (Krasnoturinsk)	1945	150	150	150	150	
	Irkutsk (Shelekhovo)	1962	280	280	280	280	70 ktpy of capacity to be added in the future (Platt's Metals Week, 8 February 1999, p. 10)
	Kamensk	1939	100	100	100	100	40 ktpy shut down (Light Metal Age, February 1997, p. 9)
Trans-World	Bratsk	1966	840	900	900	900	Capacity is gradually increasing (Platt's Metals Week, 11 January, p. 13)
	Novokuznetsk	1943	275	275	275	275	
Alumin-Produkt	Sayanagorsk	1984	384	384	397	613	Capacity increased in October 1998, large expansion to be completed in 2003 (Metal Bulletin, 15 October 1998, p. 5, 4 October 1999, p. 5)
Volgograd Aluminium	Volgograd	1959	120	130	130	130	Capacity to increase to 149 ktpy eventually (Platt's Metal Week, 9 November 1998, p. 13)
Volkhov Aluminium	Volkhov	1932	20	20	20	20	

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Total Russian Federation			**3119**	**3209**	**3224**	**3440**	
Slovakia							
Slovalco	Ziar-nad-Hronom	1953	110	110	110	145	Expansion planned for end of 2001 (Platt's Metals Week, 1 March 1999, p. 10)
Ukraine							
Dniepr Aluminium	Zaporozhye	1934	130	130	130	130	
Total Eastern Europe			**3613**	**3703**	**3728**	**3979**	
Australia							
Capral Aluminium	Kurri, Kurri, New South Wales	1969	150	150	150	150	Smelter may be sold; 50 ktpy expansion considered, but put on hold following failure to arrange long-term power supply (Metal Bulletin, 22 November 1999, p. 7)
Alcoa of Australia	Point Henry, Victoria	1983	180	180	180	180	
	Portland, Victoria	1986	345	345	345	345	28 ktpy shut down, expansion completed in 1997 (Mining Journal, 14 August 1998)
Boyne Smelters Ltd.	Gladstone, Queensland	1982	490	490	490	490	
Comalco	Bell Bay, Tasmania	1962	128	128	128	128	
Tomago Aluminium	Tomago, New South Wales	1983	440	440	440	440	Expansion by 60 ktpy in 1998 through upgrading of existing potlines; addition of 220 ktpy potline by 2002-2003 considered (Metal Bulletin, 7 January 1999, p. 9)
Aust-Pac Aluminium	Lithgow, New South Wales		0	0	0	400	To reach full production in 2003 or 2004 (Metal Bulletin, 14 January 1999, p. 3
Total Australia			**1733**	**1733**	**1733**	**2133**	
Japan							
Nippon Light Metal	Kanbara	1940	35	35	35	35	

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
New Zealand							
NZ Aluminium Smelters Ltd.	Tiwai Point	1971	313	313	313	313	
Total developed countries			**15890**	**16302**	**16459**	**17114**	
Developing countries							
America							
Argentina							
Aluar	Puerto Madryn	1975	186	260	260	260	Capacity expansion completed in November 1999 (Metal Bulletin, 18 November 1999, p. 5)
Brazil							
Albrás	Belem	1985	345	345	345	387	
Alcan	Aratú	1972	58	58	58	58	
	Saramenha	1945	51	51	51	51	
Alcoa	Poços de Caldas	1970	90	90	90	90	
Alumar	São Luis	1985	365	365	365	365	
CBA	Mairinque	1954	229	229	229	229	
Valesul	Santa Cruz	1982	100	100	100	100	Producing 92-94 ktpy (Metal Bulletin, 18 November 1999, p. 5)
Total Brazil			**1238**	**1238**	**1238**	**1280**	
Mexico							
Aluminio SA	Vera Cruz	1963	(71)	(71)	(71)	(71)	Closed indefinitely (Metal Bulletin, 7 September 1992)
Suriname							
Suralco	Paranam	1965	30	(30)	(30)	(30)	Closed indefinitely (Metal Bulletin, 25 March 1999, p. 5)
Venezuela							
Alcasa	Puerto Ordaz	1967	160	160	160	160	Two oldest potlines closed in 1998 for safety reasons (Metal Bulletin, 14 December 1998, p. 3); privatization to take place in 2000 (Metal Bulletin, 23 September 1999, p. 11)

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Venalum	Puerto Ordaz	1978	430	430	430	430	Privatization to take place in 2000 (Metal Bulletin, 23 September 1999, p. 11)
Total Venezuela			**590**	**590**	**590**	**590**	
Total America			**2044**	**2088**	**2088**	**2130**	
Africa							
Cameroon							
Alucam	Edea	1957	88	88	88	88	
Egypt							
Egyptalum	Nag Hammadi	1975	230	230	230	230	
Ghana							
Volta Aluminium Co.	Tema	1967	200	200	200	200	80 ktpy shut down during 1999 because of power shortage (Platt's Metals Week, 21 December 1998, p. 8); back to output of 160 ktpy by end 1999 (Metal Bulletin, 25 October 1999, p. 5)
Mozambique							
Mozal	Maputo		0	0	0	250	Smelter to be commissioned in early 2001 (Mining Journal, 24 July 1998, p. 51)
Nigeria							
Aluminium Smelting Company of Nigeria (Alscon)	Ikot Abasi, Akwa Ibom		193	193	193	193	Operated at 20 per cent of capacity in early 1999, to be privatized (Metal Bulletin, 8 February 1999, p. 3); production suspended due to lack of funding (Metal Bulletin, 14 June 1999, p. 17); re-opening discussed (Metal Bulletin, 6 September 1999, p. 13)
South Africa							
Alusaf	Richards Bay, Bayside	1971	220	220	220	220	
	Richards Bay, Hillside	1995	466	466	466	466	
Total South Africa			**686**	**686**	**686**	**686**	

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Total Africa			**1397**	**1397**	**1397**	**1647**	
Asia							
Azerbaijan							
SAZ	Sumgait	1955	60	60	60	60	
Bahrain							
Alba	Ras Zurrayed (Knuff)	1971	500	500	500	500	Expansion to 750 ktpy studied, may be completed by 2004 (Metal Bulletin, 23 September 1999, p. 6)
China							
Nonferrous Metals Industry Bureau and provincial governments	Baiyin, Gansu		55	55	55	105	50 ktpy to be added before the year 2000 (Light Metal Age, February 1997, p. 14)
	Baotou, Inner Mongolia		71	71	71	71	
	Changchun, Jilin		16	16	16	16	
	Changsa, Hunan		15	15	15	15	
	Fushun, Liaoning		110	110	110	110	Output reduced by 25 ktpy due to shortage of working capital (Metal Bulletin, 19 October 1998, p. 8), started up again in February 1999 (Platt's Metals Week, 8 February 1999, p. 10)
	Guiyang, Guizhou		240	240	240	240	
	Jiaozuo, Henan		33	53	53	100	Expansion to be completed in 2001 (Platt's Metals Week, 8 February 1999, p. 10)
	Hefei, Anhui		10	10	10	10	
	Kunming, Yunnan		60	120	120	120	Capacity expansion was to be completed by end of 1999 (Platt's Metals Week, 8 February 1999, p. 10)
	Pingguo, Guanxi Zhuang	1994	150	150	150	150	
	Qingdao, Shandong		35	35	35	35	
	Qinghai, Xining		200	200	200	200	Capacity was expanded in 1998 (Metal Bulletin, 28 September 1998, p. 9)
	Qingtongxia, Ningxia		114	114	250	250	(Metal Bulletin, 8 November 1999, p. 6)
	Sanmenxia, Henan		82	82	82	82	
	Taiyuan, Shanxi		15	15	15	15	

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
	Wuhan, Hupei		13	13	13	13	
	Zhengzhou, Henan		135	135	135	255	120 ktpy to be added (Light Metal Age, February 1997, p. 14)
	Shanxi		0	0	0	240	New smelter, to be completed after 2000 (Platt's Metals Week, 14 December 1998, p. 10)
	Xiezhou, Shanxi		33	33	33	63	Capacity to reach 101 ktpy eventually (Platt's Metals Week, 8 March 1999, p. 3)
Lanzhou Aluminium	Lanzhou, Gansu		86	86	86	86	New 100 ktpy smelter to be added eventually (Metal Bulletin, 22 July 1999, p. 3)
	Lianhai		30	30	30	60	
Reynolds/Shanxi provincial government	Changzhi, Shanxi		0	0	0	115	New smelter to be completed by the year 2000 (Metal Bulletin Monthly, September 1996, p. 29)
Provincial governments	50 small smelters		570	570	570	570	
Total China			**2073**	**2153**	**2289**	**2921**	
India							
Bharat Aluminium Co.	Korba, Madhya Pradesh	1975	100	100	100	100	
Hindustan Aluminium Co.	Renukoot, Uttar Pradesh	1962	210	210	242	242	Capacity expansion to be completed in 1998 (Metal Bulletin, 18 August 1997, p. 6)
Indian Aluminium Co. (Indal)	Alupuram, Kerala	1943	20	33	33	33	Expansion toook place in 1999 (Metal bulletin, 15 March 1999, p. 6)
	Belgaum, Karnataka	1969	70	70	0	0	To be closed down (Metal Bulletin, 15 March 1999, p. 6)
	Hirakud, Orissa	1959	30	30	30	60	Capacity expansion to be completed 2000-2001 (Metal Bulletin, 15 March 1999, p. 6)
Madras Aluminium Co.	Mettur, Tamil Nadu	1965	25	25	25	25	Re-opened after closure, own power plant to be built (Platt's Metals Week, 11 January, 1999, p. 14, 14January 1999, p. 5)
National Aluminium Co.	Angul, Orissa	1987	230	230	230	350	Expansion to be completed in 2003 (Metal Bulletin, 18 February 1999, p. 13); partly closed for repairs, production in 1999 to be 218 ktons (Metal Bulletin, 26 July 1999, p. 9)
Sterlite Industries Ltd.	Ib Valley, Orissa		0	0	0	125	Integrated project with 250 ktpy smelter, 125 ktpy in first phase, to be completed in late 2001 (Metal Bulletin, 28 September 1999, p. 9)
Total India			**685**	**698**	**660**	**935**	

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Indonesia							
P.T. Indonesia Asahan	Kuala Tanjung	1983	225	225	225	225	
Iran (Islamic Republic of)							
Al Mahdi Aluminium Corp.	Bandar Abbas	1997	220	220	220	220	
Iralco	Arak	1972	120	120	120	120	
Prime International	Qeshm		28	28	28	28	
Total Iran (Islamic Republic of)			**368**	**368**	**368**	**368**	
Korea D.P.R.							
State	Chinampo		20	20	20	20	
	Pyongyang		20	20	20	20	
Total Korea D.P.R.			**40**	**40**	**40**	**40**	
Tajikistan							
TAZ	Regar	1975	520	520	520	520	
Turkey							
Etibank	Seydisehir	1974	60	60	60	60	
United Arab Emirates							
Dubai Aluminium	Jebel Ali	1979	390	536	536	536	The expansion was completed in October 1999 (Metal Bulletin, 4 October 1999, pp. 6)
Total Asia			**4921**	**5160**	**5258**	**6165**	
Europe							
Bosnia and Herzegovina							
Energoinvest	Mostar	1981	(91)	(91)	(91)	(91)	The smelter was closed down in 1992 and has been damaged by the hostilities; it is unlikely to be re-opened in the foreseeable future (Metal Bullletin, 25 January 1996, p. 6)

Country/company	Location	Start-up	Capacity				Comments
			1998	1999	2000	2003	
Croatia							
TLM	Sibenik	1973	(75)	(75)	(75)	(75)	The smelter has been severely damaged by hostilities and is unlikely to re-open in the foreseeable future (Metal Bulletin, 25 January 1996, p. 6).
Slovenia							
TGA	Kidricevo	1954	75	75	75	75	
Yugoslavia							
Kombinat Aluminijuma Titograd-Niksic	Podgorica	1972	110	110	110	110	Managed by Glencore (Platt's Metals Week, 28 December 1998, p. 12)
Total Europe			**185**	**185**	**185**	**185**	
Total developing countries			**8547**	**8830**	**8928**	**10127**	
Total world			**24437**	**24832**	**25387**	**27241**	

Sources: Trade journals

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POLICIES FOR SMALL-SCALE SUGAR CANE GROWING IN SWAZILAND

This report was prepared for UNCTAD by Michael von Kaufmann, consultant, under project SWA/99/A06, financed by the Common Fund for Commodities. It has been lightly edited. The views expressed in the report are those of the author and do not necessarily represent the views of the UNCTAD secretariat.

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List of acronyms

ACP	African, Caribbean and Pacific countries
CDC	Commonwealth Development Corporation
CPRC	Cane Prices Review Committee
cusec	Cubic foot per second (flow of water) = 28.2lt/s
EIA	environmental impact assessment
ESRA	Economic and Social Reform Agenda
EU	European Union
Illovo	Illovo Sugar Ltd., South Africa
KRBDA	Komati River Basin Development Authority
MOAC	Ministry of Agriculture and Cooperatives
MOEE	Ministry of Enterprise and Employment
MOF	Ministry of Finance
Msco	Mhlume (Swaziland) Sugar Co. Ltd.
NDS	National Development Strategy
RDS	Ratoon Stunting Disease
SACU	Southern African Customs Union
SADC	Southern African Development Community
SASA	South African Sugar Association
SASAEX	South African Sugar Association Experiment Station
SCGA	Swaziland Cane Growers Association
SIDC	Swaziland Investment and Development Corporation
Simunye	Simunye, Royal Swaziland Sugar Corporation
SKPE	Swaziland Komati Project Enterprise
SNL	Swazi Nation Land
SPS	Special Preferential Sugar
SSA	Swaziland Sugar Association
SSAES	Swaziland Sugar Association Extension Service
Tibiyo	Tibiyo Taka Ngwane, the Swazi Nation Development Fund
VIF	Vuvulane Irrigated Farms
VFA	Vuvulane Farmers Association

Executive summary

The present report was prepared for UNCTAD under project SWA/99/A06, funded by the Common Fund for Commodities. According to the terms of reference, the report should:

- Review the role of sugar in Swaziland's economy and the scope for expansion and development of the sugar industry;
- Review the effectiveness of the Sugar Act of 1967 with respect to development of the sugar industry, including its effects on production, domestic and international trade and marketing and pricing;
- Assess the role of stakeholders, including, in particular, small-scale farmers, in sugar production and trade;
- Identify constraints to the expansion of production and participation in the industry by small-scale sugar farmers; and
- Propose measures to eliminate or reduce those constraints, including international assistance.

The sugar industry, which includes the growing of cane, its processing into sugar and its by-products, is of great importance to the Swaziland economy. In 1998, it accounted for 18 per cent of national output, 22 per cent of private sector employment, 15 per cent of national employment and a third of total export value.

In both 1997 and 1998, the industry produced a total of 3.9 million tons of cane. The sugar produced from this cane amounted to approximately 475,000 tons each year. Roughly half of the production is sold on the domestic and regional (Southern Africa) markets, with only a small portion going to domestic consumption. The balance is exported outside the region, with 197,000 tons going to preferential markets in the European Union and the United States. A residual quantity is sold on the open world market, with 30,000 tons budgeted for 1999. On several occasions in the past, however, exports to the European Union were higher than planned, due to the inability of other exporting countries to use up their export quotas. Swazi sugar exports have been almost completely unaffected by recent falls in demand and prices on the world sugar markets, due to the existence of the preferential and regional agreements. The Swazi sugar industry is considered to be one of the lowest-cost producers in the world.

There are three sugar mills in the country, all located in the eastern lowveld, and each with a capacity to produce around 160,000 tons of sugar per year. About 64 per cent of this cane is grown by the millers on land they own, which is in close proximity to the mills. More than 50 per cent of two mills and 40 per cent of the third mill are owned by the Government

or by Tibiyo, the national development fund. The mills are managed by three different companies. All sugar cane grown in Swaziland is irrigated.

The SSA, which was created by the Sugar Act of 1967, is an industry organization which includes all growers and mills. The Sugar Act, together with the Sugar Industry Agreement and the constitution of the SSA, regulates all aspects of the industry from the right to grow cane to how the sugar is marketed. The Act delegates considerable authority to the SSA with respect to the implementation of these matters.

The sugar industry is poised for major expansion over the next 10 to 15 years, with two major development projects in the pipeline. The Komati River Basin SKPE project is under way; the construction of a new dam (Maguga) is due for completion in 2002, while the lower Usuthu River Basin project is about to enter the EIA phase.

Since Swaziland is a low-cost but relatively small producer of sugar in terms of world demand, it can be assumed that there is room for expansion of its sugar production. The most important constraint to an expansion of capacity, however, is the availability of water for irrigation. The planned Maguga dam will entrap the high summer flows on the Komati River and store them for release later in the dry winter and spring months. This dam will make it possible for about 8,000 hectares to be brought under irrigation, some 6,000 hectares of which is earmarked for small-grower sugar cane.

The plan for the Usutu, another major river, is for a diversion weir and canal to be built to divert the summer peak flow into an offline dam (Bovane). This will bring some 10,000 hectares under irrigation, all of which is also earmarked for small-grower sugar cane.

These two projects will produce an additional 1.6 million tons of cane, yielding 205,000 tons of sugar. This sugar will dilute the overall price paid to all growers, as it may have to be sold at world market prices. The expansion of capacity will facilitate the entry of small-scale cane growers into the industry, an objective to which the Government is committed.

In the Government's opinion, a major benefit of the increased sugar production would be the resulting investment in infrastructure, particularly irrigation facilities. Income from sugar exports would pay for the investment, which - if sugar production eventually becomes less profitable in, say, 15 years - could be used for other crops. From the point of view of the sugar mills, it would be preferable to amortize the capital costs of the capacity increase necessary to handle additional sugar cane production over a longer period. Thus, they would want to be assured that mill capacity would be fully utilized for as long as possible. This is in recognition of the fact that the mills have to make considerable investments to process the sugar cane resulting from the expansion.

Land is not a constraint, since there is plenty of good land available, which is at present used for extensive grazing. However, most of the land available and suitable for cane is Swazi Nation Land, without title deeds, and is used traditionally in a communal way by clans under the control of the chief. Thus, it cannot be used as collateral for the loans necessary for small-scale growers to finance capital investment and provide operating capital.

Water will become available with the development of Maguga and Bovane dams in the next few years, and there are plans to revitalize the control and management systems for the allocation of the water. The control and use of water will be a critical element in the overall success of the industry in years to come.

Access to finance is at present the biggest constraint for small growers joining the industry. There are few institutions that will lend money without collateral. These few rely on the mills to oversee the development and direct all cane payments to the institution so that they get first call on any monies earned. This has worked well, and farmers have paid off loans much sooner than expected.

A review of the Sugar Act and its application by the SSA shows that the Act in its present form does not constitute an obstacle to the entry into sugar cane-growing by small-scale farmers. Small-scale farmers are eligible to receive a quota, provided they have access to land and water. The quota obliges the farmer to deliver the cane to a designated mill that has the capacity to crush it. The sum of the quotas is based on what the SSA can sell in any year. At present, allocated quotas do not fully meet the capacity of the mills. Hence, and taking into account planned expansions in milling capacity, it should be possible to increase production by smallholders. If it is assumed that the latter can develop 1,600 hectares per year, then an investment of E 20,000 per hectare and a four-year payback period implies a financing need of E 80 million (US$ 13.5 million).

The following recommendations may be made:

1. Present land tenure policies and legislation should be reviewed in order to facilitate commercial farming on Swazi Nation Land, as stated in the National Development Strategy.

2. The Government should review ways of providing loan guarantees for small-scale sugar farmers.

3. Measures, including legislation, should be considered to ensure that farmers' associations and farmers' cooperatives are legally constituted under the cooperatives legislation.

4. Existing legislation to ensure the maintenance of sugar cane-growing standards needs to be amended so as to make it enforceable. Those who endanger the viability of the industry by flouting the plant protection laws and the mill group rules should either be obliged to comply or prevented from endangering the viability of other growers.

5. The taxability of income from commercial farming on Swazi Nation Land should be clarified.

6. The Ministry of Agriculture should consider the possibility of monitoring yields. Any field that fails to meet an agreed minimum reference yield should be investigated on the grounds of wasting a national resource.

7. The purpose and use of the Sugar Export Levy should be reviewed by the Government in association with the SSA, with particular attention to the usefulness of earmarking the levy for projects aiming to develop the sugar sector.

8. The establishment of a development fund, administered by the industry and aimed at assisting new small-scale participants, should be considered.

9. The Government should convene a meeting with all concerned parties, including the SSA, to draw up an inventory of services and assistance required for eventual submission to international donors.

10. Preference should continue to be given to new small growers or associations of small growers entering the industry.

11. To the extent that availability of land becomes a constraint on the expansion of small-scale cane-growing, millers cum planters and other major growers should consider ways of divesting some of their land to allow new, smaller growers to join the industry.

12. The SSA should consider ways to continue to ensure that new and existing small growers receive the required amount and type of extension services in order for them to contribute fully to the industry. The cost of this is likely to put an unfair burden on existing growers if it were to be funded from a straight levy.

13. The SSA should consider new ways of explaining its functions and activities to the public.

14. Grants and/or loans should be provided to finance the entry of small-scale farmers into sugar cane-growing.

15. Improved training needs to be provided both to trainers and growers, particularly in all aspects of cane-growing and in such support services as bookkeeping, money management, loan applications and administration.

16. Funding is needed for small and medium enterprises providing support services to sugar cane growers, including machinery pools, haulage contractors, land developers, farming contractors and management services.

17. The extension services of both the Ministry of Agriculture and the Sugar Association need assistance in order to cope with the increased number of recipients.

18. Assistance will be needed with the establishment of secondary industries operating on by-products of the sugar industry, such as feedlots and pig farms, as well as with support to non-cane growers, in such forms as tractor maintenance facilities, cooperative ranching and improved grazing.

19. Assistance will be needed with infrastructure development projects, both in new cane-growing areas and with the modernization and rehabilitation of infrastructure in areas where cane is already grown.

The existing cooperation between government and the industry is essential to the industry's health, and all efforts must be made to ensure that it continues. The King is determined to see growth in the sugar industry through the entry of small growers. His enthusiasm is a major positive factor that will facilitate the initiation of projects and reduce conflicts between the parties concerned.

INTRODUCTION

The present report was prepared for UNCTAD under project SWA/99/A06, funded by the Common Fund for Commodities. The terms of reference for the report are reproduced in Annex I.

The structure of the report is as follows:

- An introduction to Swaziland as a country;

- A brief overview of developments in the international sugar economy, including the existence of and planned changes to tariff and non-tariff measures;

- An overview of the sugar sector in Swaziland and its contribution to the country's economic development;

- A review of the participation by the various stakeholders in the sugar industry and identification of the constraints to improving that participation, particularly for small farmers;

- Discussion of the probable socioeconomic and environmental effects of increased small-scale sugar farming;

- A detailed review of the Sugar Act of 1967, including:
  - the effectiveness of the Act in facilitating trade, and compatibility with international rules;
  - the appropriateness of arrangements for sugar production; and
  - the impact of the Act on marketing and pricing.

- Recommendations for government policies and actions with a view to improving the industry's contribution to the national economy and to alleviating the constraints to increased participation, particularly by smallholders, and on the need for international technical and financial assistance.

Annex 3 contains a list of persons met by the consultant in Swaziland. Unfortunately the Managing Director of Tibiyo, Taka Ngwane, was not available during the period of the study, and all attempts to discuss the project with Tibiyo staff were referred back to him. The consultant would like to thank all those who supplied information, discussed ideas, and generously provided other assistance and advice.

The possibility of conducting a broader study has been discussed by the Government and the industry. While it was not possible to take into account all the aspects that would have been covered in a broader study, it is hoped that the present report will contribute to the identification of constructive solutions to the problems of the Swazi sugar sector and that it will prove useful in the context of a broader study, should one still be considered necessary (see Annex II for possible terms of reference for a study).

I. GENERAL DESCRIPTION OF SWAZILAND

Swaziland is a landlocked country located in south-eastern Africa. It is bordered by Mozambique to the east and South Africa to the north, south and west. The surface area is just over 17,000 square kilometres.

Swaziland is a monarchy. The Head of State is King Mswati III. The estimated population in 1999 was 985,335. Annual population growth is 1.91 per cent, and 60 per cent of the population is below the age of 21. English and siSwati are the two official languages, with English widely spoken in business and commerce. The currency is the lilangeni, plural Emalangeni (E), which is equal to the South African rand (R). Exchange rates in May 1999 were US$ 1 = E 6.00 and Euro 1 = E 6.60.

Swaziland was a British High Commission territory until independence in 1968 and is now a member of the Commonwealth.

The country is divided into four distinct geographical regions running north to south, each with its own climate and characteristics:

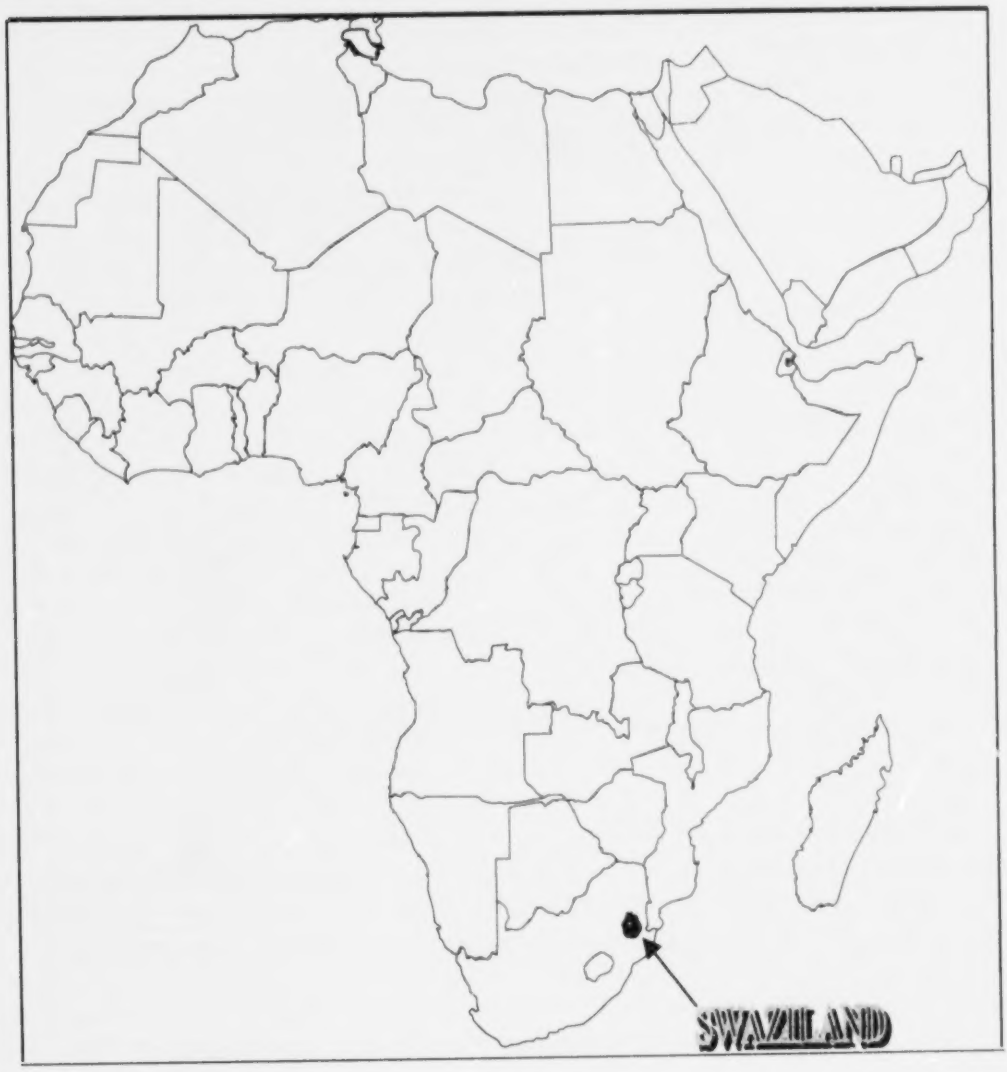
The Highveld: The westernmost region is a mountainous area with an average altitude of 1,300 metres and is split by many rivers, valleys and gorges. This area receives the highest rainfall, almost year-round (up to 2,700 mm), with temperatures ranging from 4.5°C to 33°C. No cane is grown in this region.

The Middleveld: Lush, fertile valleys dominate this undulating region, which has an average elevation of 700 metres. Much of the country's agricultural activities is centred here, as the warmer and drier climate makes it ideal for crop production. Temperatures range from 2.5°C to 37°C and average annual rainfall from 450 mm to 1,400 mm. Some sugar cane is grown in this region.

The Lowveld: This region is characterized by typical African bush vegetation; indigenous wildlife and flora abound at an altitude of around 300 metres. The climate, like that of the Middleveld, is subtropical, although it is hotter and drier. Temperatures range from 2.5°C to

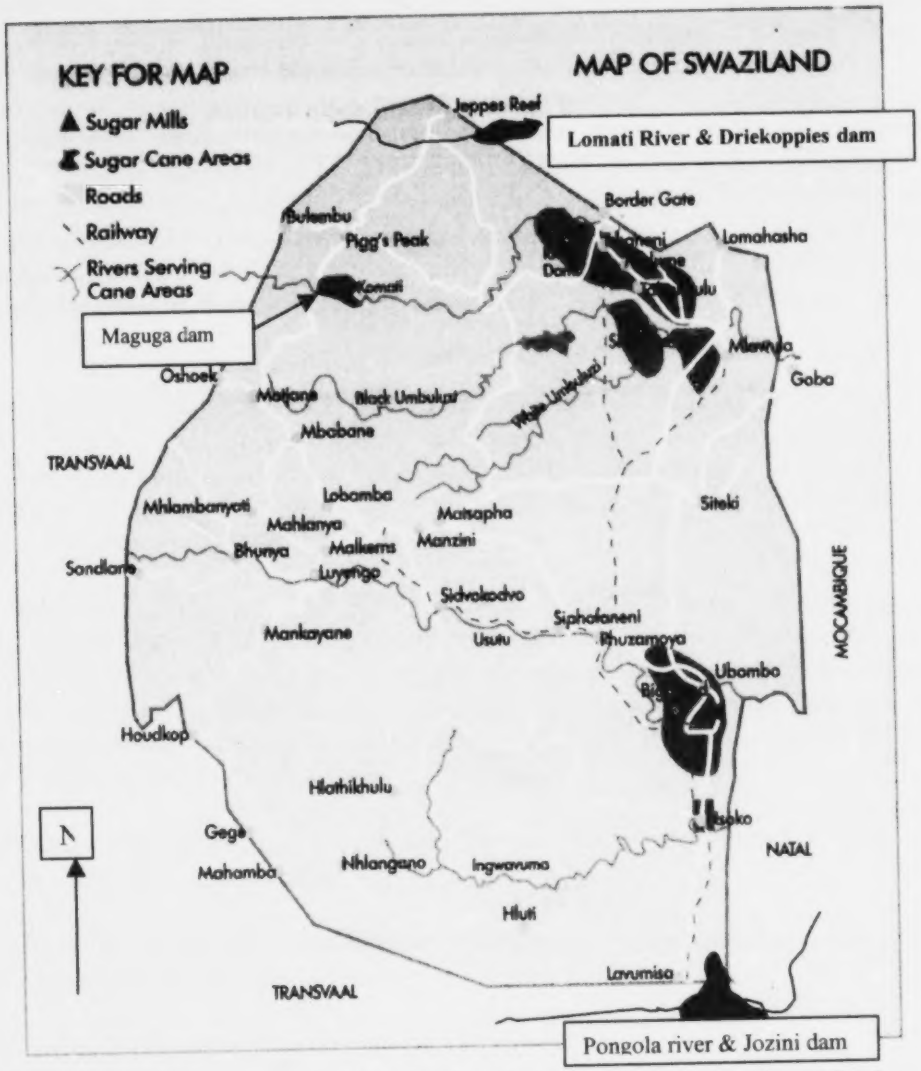
45°C and the average annual rainfall from 217 mm to 2,000 mm. Two major export crops, sugar and cotton, thrive in the region, together with cattle farming. This is the country's main cane-growing region.

Figure 1. Swaziland's location



The Lubombo: This region, the smallest in Swaziland, is an escarpment running along the eastern length of the Lowveld, broken by gorges formed by three main rivers. With an altitude of some 600 metres, the region has a subtropical climate similar to that of the Middleveld. Mixed farming takes place in the Lubombo. No sugar cane is grown at present.

Figure 2. Map of Swaziland



Source: Swaziland Sugar Association Profile (dams and rivers added by author)

II. THE INTERNATIONAL SUGAR MARKET

Sugar is derived from two sources: sugar cane and sugar beet. Sugar cane is a tropical perennial crop, while sugar beet is an annual root crop grown in the temperate regions of the world. Both are traded as sugar on the world market and are not traded as different products. High-fructose corn syrup and other sweeteners are not considered in this report, although they do compete with sugar for certain markets.

The world market is currently in turmoil. The *South African Sugar Journal* of June 1999 comments as follows: "*With a market trading at 13-year lows of sub-5c/lb values, it is not*

surprising to be talking of large surpluses hanging over the market. All statisticians have raised production estimates for the first quarter 1999. F O Licht[1] has just pegged production at 130 million tons or 4 million up on the November estimate. The International Sugar Organisation has also raised its estimate by 1 million tons. Perhaps of concern is the wide variation in the actual surplus for the year, which varies from 2-5 million tons depending on certain country estimates (Brazil is a big unknown) and stock levels. But of greater concern is the continuing rise in production in the 1999/2000 crop year, which F O Licht has just forecast could rise to a record 132 million tons. Crops have tended to be higher this past season, particularly in Cuba and Thailand, which have both produced 500,000 tons more than original estimates. Stocks at the end of the 1998/99 season are estimated at 47 million tons or 37% of world consumption, compared to 37 million tons just five years ago. High levels of stocks need time to work through the system to alleviate the market's lacklustre price. However, there is always the unknown factor that can radically change perceptions, undermine the statistics and cause a rapid change in fortunes — it's been known — the last time sugar traded at historic lows in 1985 of 2.3c/lb, it took less than a year for a recovery back to 9.5c/lb — a caveat to any bear market player".

World production of both cane and beet sugar in 1997[2] was 160 million tons. Of this, 43 million tons, or about 25 per cent, were exported. In 1997, world sugar cane production was 1.240 billion tons. It increased in 1998 to 1.252 billion tons, a 12 million ton rise, equivalent to approximately 1.5 million tons of raw sugar.

The main exporting countries are Brazil (6.7 million tons of cane sugar), Australia (4.3 million tons of cane sugar), Cuba (3.6 million tons of cane sugar), Thailand 3.4 million tons of cane sugar), Mexico (1.1 million tons of cane sugar), Guatemala (1 million tons of cane sugar), South Africa (1 million tons of cane sugar), France (3.9 million tons of beet sugar) and Germany (1.9 million tons of beet sugar). The balance is supplied by 121 other countries. The largest importers are the Russian Federation (3.9 million tons), United States (3.4 million tons), Japan (1.9 million tons) and Republic of Korea (1.5 million tons). Several European countries are both importers and exporters.

The world market trades approximately 40 million tons a year, and at present there is a surplus estimated at 12.4 million tons, which depresses prices. This surplus is held as stocks by the major producing countries. In order to try to smooth the cycle of price fluctuations, the major producing countries are talking of a 10 per cent cutback in production. Over a two-year period, this would remove the surplus and break the trend of even lower prices. The present price trend risks putting producers out of business and could eventually lead to a world shortage, resulting in very high prices in about five years' time. Swaziland, which is a low-cost producer, is expected to survive reasonably unscathed.

The world market is currently depressed due to the Asian crisis, which resulted in reduced demand. Low oil prices caused some countries, such as Brazil, to divert cane from ethanol production to sugar production, thus further aggravating the problem.

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[1] FO Licht is a firm of international sugar traders.

[2] 1997 figures are quoted, as that was the last year for which full figures are available from the Food and Agriculture Organization (FAO).

The long-term trend in world sugar prices is a decline in United States dollar terms of 2 per cent a year. The possible abolition of preferential trade agreements could result in an even more negative price trend for Swazi sugar exports. Swaziland sells very little on the open world market and projections, taking into account expected increases in production over the next 10 years, indicate that significant amounts of sugar will not be placed on that market. The projections are for less than 30,000 tons for the current year, but there will definitely be increasing amounts of sugar to be disposed of on the world market over the next 10 years.

The world market is operated by a number of traders who negotiate deals, selling to customers on behalf of producer countries, for a fee. Sugar futures are also traded to hedge costs.

Swaziland is one of the lowest-cost producers of sugar in the world. The decline of the South African rand and Swazi lilangeni against the United States dollar has further improved the competitiveness of its sugar industry. The price of sugar is quoted in United States dollars, and transactions in any other currency are converted to dollars for payment. A very large portion of the industry inputs is manufactured within the SACU, mainly South Africa. Consequently, since the Swazi lilangeni is maintained at par with the South African rand, the relation between input costs and prices is almost wholly dependent on the rand/dollar exchange rate. An appreciation of the rand would thus lead to a decline in competitiveness, while a depreciation would enhance the industry's competitive position. The evolution of exchange rates obviously has to be monitored carefully by the industry, and risk management techniques could play an important role in protecting against sudden declines in sugar prices in emalangeni terms.

III. THE SWAZILAND SUGAR INDUSTRY

A. Overview

Sugar is the mainstay of the Swaziland economy, with cane-growing accounting for 53 per cent of agricultural output and 34 per cent of agricultural wage employment for the period 1995-1996. Milling accounted for 37 per cent of total manufacturing output and 22 per cent of manufacturing wage employment for the same period. In addition to these direct contributions a whole host of support services and industries are dependent on the sugar industry. The total contribution of the sugar industry to the economy is over E 900 million. Exports to international markets are valued at more than E 500 million, or one third of all export earnings.

Some 16,000 people are directly employed in the sugar industry, corresponding to about 15 per cent of formal sector employment. About 80,000 people are dependants of those employed in the sugar industry (source: Ministry of Enterprise and Employment).

Swaziland has three sugar mills, all milling roughly the same amount of cane and capable of producing the same amount of sugar, approximately 160,000 tons per year. They are owned by three different companies:

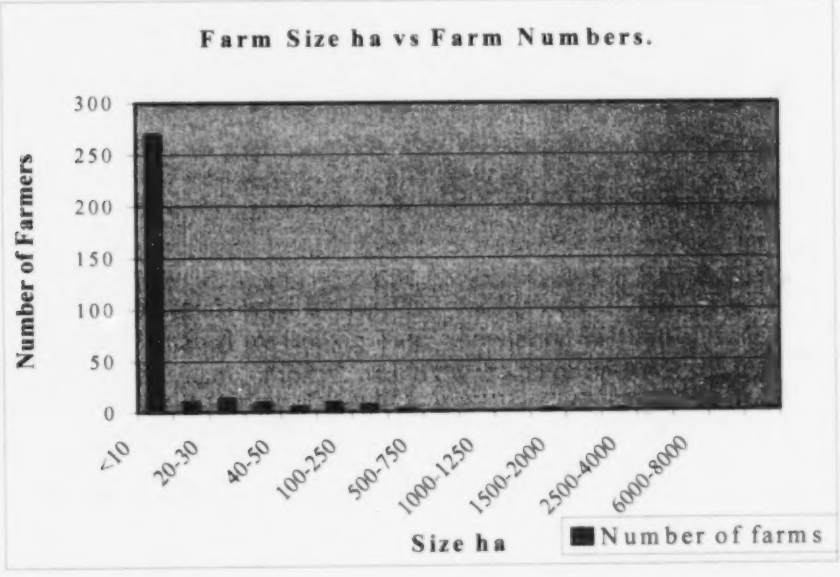
- *Ubombo* in the south-east, owned by Illovo and Tibiyo Taka Ngwane and managed by Illovo, started in 1958. Illovo Sugar is a large South African sugar milling company based in Durban and quoted on the Johannesburg stock exchange. Tibiyo Taka Ngwane is the Swazi Nation Development Fund, which was originally formed to invest the royalties paid by mines. It is a major investment partner in the country and is controlled by a board of directors appointed by the King.

- *Mhlume* in the north, owned by the CDC and Tibiyo Taka Ngwane and managed by CDC, started in 1960.

Simunye in the north-east, owned by Tibiyo Taka Ngwane , CDC, Tate and Lyle, and several other investors, managed by Booker Tate, and started in 1980. (Tate and Lyle is a British-based transnational sugar company, which owns and/or operates sugar factories of all types in many countries. Booker Tate is a management company formed by Booker PLC and Tate and Lyle.)

These three mills process close to 3,800,000 tons of cane to produce nearly 500,000 tons of sugar per year.

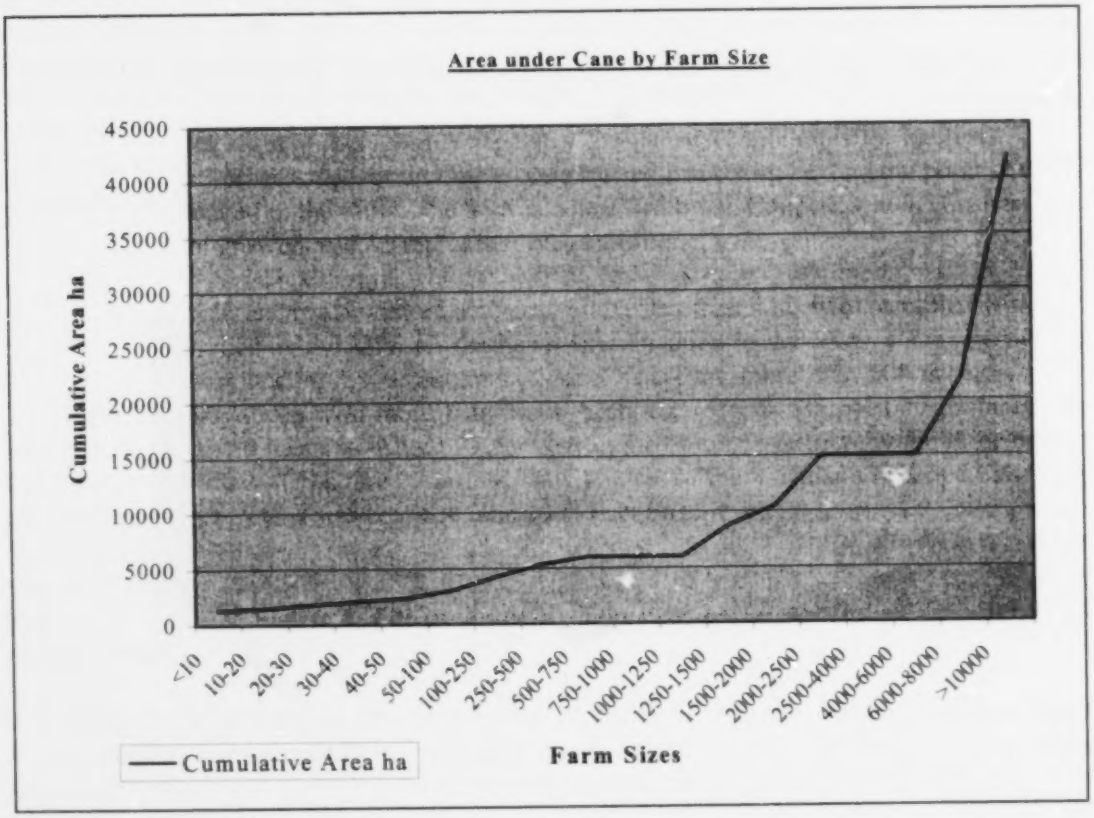
Figure 3. Farm size (hectares) and number of farms



The sugar industry is controlled by the Sugar Act of 1967, which created and gave wide powers to the SSA. The functions, powers and duties of the SSA are set out in the Swaziland Sugar Industry Agreement, created by a schedule of the Act. The SSA is an association of the cane growers and sugar millers which regulates the industry, promotes its interests, and is responsible for all processing, conditioning, bagging and marketing beyond the point at which raw sugar is produced in the mills. The SSA is controlled by its Council, which consists of 12 representatives of growers and 12 representatives of millers.

No cane can be grown without a sucrose quota (in effect a licence) or milled without a milling licence issued by the Minister on the recommendation of the SSA. Cane is grown on 38,000 hectares, producing 3,800,000 tons of cane. There are more than 500 growers in the industry, including seven with more than 1,000 hectares, 15 with 50 to 1,000 hectares, and 458 with less than 50 hectares. About 77 per cent of the crop is produced by the three millers and four large growers (in figure 3, the 264 smallholders of the Vuvulane Irrigated Farms are counted as one grower). (Source: SSA June 1998 Fact Sheet # 12.)

Figure 4. The area under sugar cane by farm size



The millers and some of the larger growers make a very significant contribution to development. They provide pre-primary, primary, and high schools on the estate and sponsor

further education for some students by means of scholarships. Estate schools are some of the best-equipped and best-staffed in the country. They also supply free medical service to employees and their families. Free or subsidized housing, electricity and water are usually offered as well, and some of the larger estates provide home ownership schemes.

B. Legal and institutional arrangements for growing, processing and marketing

1. Cane-growing

A quota or licence is required to grow sugar cane. Under a previous arrangement, quotas were divided into "A" and "D" groupings, where the "A Quota" was the confirmed quota held by a grower allocated on the basis of previous performance, which could be reduced only by failure to produce the required total in two out of three consecutive years, while the "D" quota was an additional amount allocated to new growers to be converted to "A" quota over a period of years depending on performance. This system has been phased out and a single-quota structure will be adopted as from the 2001/2002 season.

The aim of the quota system is to ensure that the miller can handle the crop, that the grower has the water to grow a disease-free crop, that the grower has the land or right to use the land, and that the grower is conversant with the rules of growing cane and the relevant legal obligations.

A miller requires a licence to mill cane. This licence is issued by the Minister on the recommendation of the SSA and is intended to ensure the long-term viability of the industry and that a sound investment study is done before a new mill is licensed.

The quota system, as explained in the Act and by Westlake *(Prospects for Swaziland's Sugar Industry in SACU)*, has changed in the last few years, with all schedule D quotas having been converted to schedule A quotas. Quotas were automatically increased by 5 per cent in 1996 and have been increased by 2.5 per cent annually ever since. This annual increase will be maintained at least until 2001. Quotas corresponding to 40,000 tons were set aside for new entrants in 1996/1997, and more is available should it be required. These actions mean that the quotas will be less than necessary from the standpoint of allocation of production. However, it may be desirable to retain the quota system for other reasons, for instance, to ensure adequate pest control. A decision will be taken in 2001 on whether or not the quotas should be phased out completely.

All cane grown in Swaziland is grown under irrigation. The area under furrow irrigation has declined from 55 per cent in 1994/1995 to 39 per cent in 1998/1999. A further 54 per cent is under sprinkler irrigation, while 4 per cent is under drip irrigation and 3 per cent under centre pivot. There is a trend away from furrow and sprinkler irrigation to drip and centre pivot systems, which use less water —the main constraint to expansion — and have a higher efficiency of application. The good soils found in most cane-growing areas, and the almost ideal climate, supplemented in early parts of the season by chemical ripeners, result in some

of the highest yields in the world. Annex IV contains tables relating to world cane sugar production and Swaziland's performance in relation to other countries.

The plant crop is harvested after 12-13 months and subsequent ratoon crops every 11--12 months. Sugar cane is a perennial grass that grows from the eyes or buds on the stem nodes. It ratoons (regrows) from the stool or stump that is left after harvest, and will regrow many times. It is only ploughed out and replanted when yields are sub-economic. In the best growing areas and with good management up to 25 ratoons have been achieved. The average in Swaziland is 6-8 ratoons before plough-out and replanting, but this should increase to 8-10 ratoons as more land goes under drip and centre pivot irrigation systems.

There are seven approved varieties of cane that can be planted at present, and five varieties that are conditionally approved, which means that fields of these varieties can be grown but no more land can be planted with them. Nco376 is the most common variety, accounting for 58 per cent of all cane grown, followed by N14 at 19 per cent and N19 at 13 per cent. Other varieties make up the remaining 10 per cent. Smut is a fungus disease which attacks most varieties of cane, some more than others, severely depressing yields. Infection is very easily spread by windborne spores, which makes it important to keep it under control and eradicate it where possible. Nco 376 is very susceptible to smut, but it is the highest-yielding variety in Swaziland. Despite efforts to breed a replacement, it has yet to be surpassed economically, especially in the early and late parts of the season. Other varieties that were thought resistant are now succumbing, under pressure resulting from poor management by a few irresponsible and stubborn growers who are endangering the crops of all well-managed sugar cane farms.

All cane is cut by hand except for a small amount which is cut by mechanical chopper-harvesters at Simunye, as part of a pilot project to obtain costs and performance figures for future mechanization, should this become economical or should the availability of cane-cutters decrease. Mechanical harvesting is likely to be adopted in time for most suitable areas — i.e., flat stone-free areas with long rows — as labour rates rise or labour shortages occur. In Australia and the United States, the entire sugar cane crop is mechanically harvested. A cane combine or chopper harvester, as they are sometimes called, is capable of cutting 50 tons/hour or up to 60,000 tons in a season. A man can cut 10 tons a day or 2,000 tons per season. Accordingly, for the small farmer delivering less than 250 tons a day, a combine would not be economical.

The introduction of choppers to Swaziland must take into account the availability or shortage of cutters as well as the economics of labour vs. mechanization. Too rapid a mechanization will result in the unemployment of manual cane-cutters, as will too rapid a rise in wages. A chopper-harvester could cut and load cane for around E 11 per ton. A cane-cutter earns around E 40 a day for cutting 10 tons, or E 4 a ton. With other costs at E 4/ton and loading costs of E 3 or E 4, depending on the system used, the costs of manual cutting are E 11-12. The costs are thus similar, and it can be assumed that the economic changeover point is fairly close. If the mechanical chopper-harvesters were better supported and not subject to the vagaries of the international currency markets, decisions to increase mechanization could be taken with confidence. A mechanical chopper-harvester costs US$ 250,000, so a currency depreciation from E 6 to the dollar to E 7 to the dollar adds E 250,000 to the price of the

machine. Since the harvester can be expected to last for 10,000 hours, the cost per hour increases by E 25, or E 0.50/ton, not counting the effects of a depreciation on the cost of spare parts and repairs.

Cane-cutting is hard and unpopular work. As long as unemployment is relatively high and education levels low, an adequate workforce will be available, but the long-term trend shows a decrease in the supply of labour, in spite of cane-cutters earning about E 40 per day plus food, as compared to E 28 for general manual labour. The effects of HIV on the population could also deplete the performance and number of workers.

Large parts of the cane-growing areas could be mechanically harvested but some areas would be taken out of production if all cane were to be mechanically harvested. This is unlikely to be the case for many years, but mechanical harvesting will increasingly become the economic option on large, well laid-out fields.

The amount of cane grown in each mill area, and the proportion grown by the miller and by growers for each mill area, are shown in table 1.

Table 1. Cane production by milling companies and growers (1998/1999)

Mill Area	Mill Co (tons)	Growers (tons)	Total (tons)	Mill Co (%)
Ubombo	727,534	811,491	1,539,025	47.27 %
Mhlume	816,714	446,832	1,263,546	64.63 %
Simunye	923,729	125,390	1,049,119	88.04 %
National total	2,467,977	1,383,713	3,851,690	64.08 %

The SSA annual report for 1998 indicates that the area under cultivation by small growers and the sucrose produced by them have risen rapidly since 1992, when these growers cultivated less than 200 hectares and produced less than 2,000 tons of sucrose. In 1998, excluding VIF and VFA, small growers cultivated just under 1,200 hectares, producing 84,000 tons of cane and 11,000 tons of sucrose. Over 22,000 tons of sucrose quotas have been allocated to small growers. The quota has yet to be filled, due to problems in obtaining the financing for new growers to start developing and planting. Small-grower yields are amongst the best in the industry and are definitely not below par. This is very encouraging when compared with South Africa, where small-grower yields are some 37 per cent below the national average.

2. Processing

All three mills can produce Very High Pol[3] (VHP) sugar at 99.4° pol and raw sugar at 98.5° pol. Ubombo and Mhlume mills can also produce refined sugar. Simunye has a

[3] Pol is a measure of purity. It measures the degree of polarization of light refracted through a solution of the sugar as a proportion of polarization through a pure sugar solution.

distillery that produced 12 million litres of alcohol from 48,000 tons of molasses. A new distillery is being built south of Big Bend on the Usuthu River but is not yet commissioned. It has reserved 16,000 tons of molasses for the 1999/2000 season.

All sugar is owned by the SSA, and any refining is undertaken on behalf of the SSA for a fee. Based on projected demand, the association instructs each mill as to what percentage of each type of sugar to produce. All growers are responsible for, and bear the cost of, delivering their cane to the mill. Once delivered, the cane becomes the responsibility of the mill. Payment is based on the weight of sucrose delivered.

3. Marketing

The SSA markets all Swaziland sugar and by-products, other than by-products used by the sugar companies, such as bagasse for firing boilers.

SSA is well aware of the need to maximize returns and to this end has recently completed a review of its marketing. It has also recruited a commercial manager to head the marketing division.

The three main market areas, with the corresponding quantities sold in 1998 are:

- SACU (Swaziland, Botswana, Lesotho, Namibia and South Africa): 247,000 tons
- Preferential markets (EU and United States): 197,000 tons
- World market: 23,000 tons

The domestic market in 1998 was made up of 34,802 tons of brown sugar and 7,907 tons of white sugar sold through 14 local pre-packers. Local industrial sales of 170,542 tons are mainly to local manufacturers of blended products and a small proportion to manufacturers of jellies, jams, chutneys, cordials and juices. Some 51,591 tons were sold on the regional market at above world market prices, averaging 14.21c/lb. Regional sales are purely on demand and are not bound by any agreements other than sales to South Africa, which are covered by an agreement with the SASA.

Only excess sugar is traded on the open world market. Swaziland's preferential export markets are negotiated under a number of protocol agreements, and the sugar is supplied direct to overseas refiners under contracts between the refiner and the SSA. These agreements are due to Swaziland's historical position as a member of the Commonwealth and of the ACP group of countries under the Lomé IV Convention. Under that convention, 120,000 tons can be exported to the EU. This sugar is priced in Euros (formerly ECUs). The depreciation of the rand (and consequently of the lilangeni) relative to the Euro has resulted in price improvements in emalangeni terms. A total of 54,000 tons were shipped to Europe, mainly Portugal, as SPS). As a result of the escudo-euro exchange rate established at the launch of the latter, prices in emalangeni terms have improved even more than for the EU-ACP quota. Swaziland has access to 1.6 per cent of United States demand for sugar. The Sugar Protocol would not be affected by any major changes to the Lomé Convention. Accordingly, present access conditions and volumes are expected to remain unchanged, although the possibility of

a progressive reduction in price cannot be excluded. In 1998, 27,461 tons were shipped to the United States. The fall of the lilangeni against the dollar led to improved prices in emalangeni terms.

Access to markets of the SACU is projected to grow at 3 per cent per year (called "deemed growth"). Accordingly, these markets for Swaziland sugar should be reasonably secure at above world market prices for the future.

Swaziland is also well placed to pick up any shortfalls in the quotas of other countries under the EU-ACP agreement. Such shortfalls have occurred in the past and are likely to occur in the future due to drought or to land being taken out of cane in high cost-producing countries.

The SSA Office performs a marketing function on behalf of the sugar industry. A Marketing Executive Committee is provided for in the Association's Constitution. There is also an Allocations Committee that decides on applications for sugar allocations and monitors the performance of the buyers.

Buyers who want sugar apply to the SSA Allocations Committee for an annual allocation to be drawn on a monthly basis. The allocation is considered on merit, taking into account the use to which it will be put. Discounts can be negotiated depending on quantity and use, with preference being given to value added and employment-generating uses. Any monthly allocation not drawn is reallocated either to new customers or to customers requiring more than their initial allocation. The present system has given rise to a number of problems, particularly with regard to applicants who have not been able to finance their allocation and instead try to sell it. The fact that a market for allocations exists seems to indicate that the system is not working efficiently. The millers have also expressed concern over the practice of sales at discounted prices, which they feel erodes the price and reduces overall profits to the industry. Instead, the millers would like to pre-pack and sell the sugar directly.

The Government supports these discounted sales to manufacturers who add value to the product and create employment in the country. They do not support discounts to agents who produce pre-packs and export.

The proceeds from all sales by the SSA are pooled. For the purpose of payment to the mills, each mill's actual output is converted to a notional tonnage of 96° pol sugar. Payments to millers and growers are based on budget projections of export realizations less SSA costs. These projections are revised quarterly. The risk of price fluctuations is well controlled, with borrowings against shipment taken in the currency in which the shipment will be paid for. Risk management costs the industry E 90 per ton in finance charges, or about 4.5 per cent, compared to local interest rates of 15 per cent. The overseas sales probably realize close to the maximum possible under the present system of 100 per cent disbursement of funds.The SSA finances all payments from borrowings and does not build up a reserve to finance purchases.

The SSA pays the millers weekly for sugar produced in the prior week. Millers in turn pay the growers for the sucrose content of the cane delivered the prior week. The proportions

of the price paid to millers and growers used to be set annually by the Cane Price Review Committee, which attempted to establish a notional cost per ton of growing and milling. This was a cumbersome procedure that discouraged efficiency, as the higher cost-per-ton producers received a greater portion of the proceeds. Since the 1996/1997 season the prices paid to millers and growers respectively are based on an agreed split. From the 2001/2002 season this split will be 32.5 per cent to the miller and 67.5 per cent to the grower. Until then the percentages shown in table 2 apply.

Table 2. Percentage price split between millers and growers

SEASON	MILLER %	GROWER%
1996/97	35.0	65.0
1997/98	34.5	65.5
1998/99	34.0	66.0
1999/00	33.5	66.5
2000/01	33.0	67.0
2001/02	32.5	67.5

Source : Sugar Act of 1967

C. Land ownership

Land ownership in Swaziland falls into four different categories:

- Freehold,
- Leasehold,
- Leasehold in trust for the Nation, and
- Swazi Nation Land.

There is very little freehold land but some of it is held by the sugar estates. Title deeds are issued and the land can be bought and sold. This land is held in perpetuity by the owner, Swaziland Ranches. The original landholding of Mhlume and Tambankulu fell into this category.

Most of the land developed for sugar cane falls into the category of leasehold land. Normal title deeds are issued and the land can be bought and sold thereafter. Most land in this classification is held on a 99-year lease from the State.

Leasehold land held in trust for the Swazi Nation consists of former leasehold farms purchased by the nation (Tibiyo in most cases) in the name of the King. There is a substantial area of land in this category suitable for cane development. Procedures for obtaining consent to use the land are not clear, and title deeds are not issued. Neither does the land fall under the control of the Chief in whose area it lies.

Swazi Nation Land is the major landholding category in the country and is held by the King in trust for the nation. The use of this land is controlled by the local Chief, who gives families the right to grow crops on a certain area or to graze cattle on the communal lands. No title deeds are issued for these lands. Tenure is governed by traditional rules and customs, which sometimes come into conflict with Western-type lending institution rules, particularly as concerns the use of the land as collateral for loans. This is the major land category available for the future development of sugar cane. The land is in many cases already allocated to people who will either grow sugar cane themselves or relinquish the land for others to do so.

Land disputes are a major cause of delays when new land is developed for cane cultivation. These disputes often arise when development work has already commenced.

D. Access to water

Water for irrigation is the single most important resource constraining further development of the sugar industry.

1. Present water situation

The map of Swaziland appearing in the introduction to this report shows the location of the rivers and of the-cane growing areas they supply. There are five major river systems originating in or crossing Swaziland from west to east (excluding the Pongola River to the south). In order of importance and size they are the Usuthu, the Komati, the Umbuluzi(s), the Ingwavuma and the Lomati.

All available water for irrigation has been allocated, including a 4-*cusec* water allocation made available from the Jozini dam, which inundates a part of southern Swaziland from the Pongola River. There are a few instances where allocated water rights are not being used or fully utilized and could be reallocated. A 12-*cusec* water right is available on the Lomati River in the north but is not in an exploitable location. This could be classed as a temporary allocation from the Lomati River's Driekopies Dam, whilst Maguga Dam is being constructed.

At present all water rights are controlled by the Department of Water Affairs of the Ministry of Natural Resources. A new Act is due to be tabled in Parliament, which will, over the next five years, create river basin authorities. These authorities will be tasked with the administration of the water in a specific river catchment basin.

2. Planned developments

The sugar industry is poised for a huge expansion as water becomes available. Currently, two major projects are under way.

The Maguga Dam on the Komati River will store peak flows in the summer for release during the drier winter months. Work has started on the construction of the dam and it is scheduled to start filling in November 2000. The dam will eventually supply enough water to bring a further 8,000 hectares of land into irrigated production, some 6,000 of which are earmarked for small-grower sugar cane. The development of this whole area will be coordinated by the recently formed parastatal authority SKPE. Its responsibilities include sourcing finance, appointing consultants and contractors, liasing with local authorities and ensuring that the project is implemented to the benefit of the local population. The control and management of water will be a major part of this project. This will require detailed planning to ensure that everything works smoothly and that the potential benefit from the water is maximized. Mhlume Sugar is the nearest miller and is actively involved. The company has launched a successful 200-hectare pilot project, Nyakatfo, which is pumping water from the Komati River using a reallocated water right.

The Komati River has been used for irrigation since the 1950s and now supplies water for irrigation. This will be enhanced by the Maguga Dam. The Komati basin has the advantage of Mhlume water management, controlling the distribution of all the water to over 12,000 hectares of sugar cane and citrus. This includes the 264 members of the VIF scheme. This expertise will be invaluable to the development of a larger multi-user system and could be expanded to manage the SKPE water for the Komati Basin River Authority, once it is formed.

Bovane Dam on the lower Usuthu River is planned as an offstream storage for 250 million cubic meters of water. This dam will also be to collect the peak summer flows for release during the drier months. The EIA study contract is about to be awarded. The development programme is being pushed to enable the first water to be entrapped in the summer of 2004/2005. This dam will bring 11,500 hectares of land under irrigation, most of which will be developed for smallholder sugar cane. This area is likely to fall under the Ubombo mill, despite some speculation about a fourth mill. Ubombo has been actively developing small growers in the area, and the number of growers registered with Ubombo has risen from 8 to 84 in the last five years.

Ubombo has also assisted with the development of the 100-hectare Lofubu smallholder pilot project, which harvested its plant crop in 1999. This project has been a successful learning exercise, the lessons of which will assist future development in the area.

A project is also under way in the Ubombo mill area to develop 160 hectares of sugar cane under drip irrigation, using water from the Jozini dam. This project is for small growers in the Lavumisa area. If it is successful it should be possible to negotiate a larger water allocation from South Africa. A concern is the long-term viability of the project. If the level of the Jozini dam should drop in drought years it would be impossible to get water once the shoreline retreats back into South Africa, as the wall and any dead storage are a long way from the Swaziland border.

Ubombo's efforts in developing small growers are most commendable, as the mill company is actively assisting growers to develop cane farms or plots. The mill cane supply manager helps potential growers with all aspects of planning, budgeting, quota application,

and liaison with contractors and suppliers. In addition, the mill supports loan applications. A number of new growers supported in this way have developed farms and paid off five-year loans in less than three years. The mill agrees to make all cane payments to the financial institution, which then pays any funds in excess of the loan repayment to the grower. In the development phase Ubombo acts as a consultant and approves any work done. It then signs the invoice, which is taken to the bank for payment. Should there be a conflict between contractor and client the company will act as intermediary.

Ubombo is also in the process of subdividing one of its freehold farms into 16 farms of between 23 and 55 hectares. These lots will be offered for sale to persons who can raise the 15 per cent deposit required by the SIDC, which has agreed to finance the project. Ubombo has prepared the budgets for these farms, and the projection is that a 47-hectare grower could earn around E 130,000 a year, taking into account the management fee included in the cost. The growers will all be members of an association that will own the water rights and manage the irrigation system. This scheme could be used as a model for other mills and large growers.

The management of water in the Usuthu river system is at present not as simple as the Komati. It is a much larger river with many users along its length, including a hydroelectric power station.

Any further expansion of water resources in the Simunye mill area is virtually impossible due to the small size of the Umbuluzi river system. All of the available water has already been allocated. A small increase in available water, to be used largely as insurance for drought years, will occur through the planned raising of the spillway of the Mjoli dam. The use of modern drip irrigation technology to replace traditional sprinkler systems is resulting in a 20 per cent water saving at Simunye. The saving is to be utilized to develop a 1,000-hectare smallholder area. The area has been selected, but progress has been on hold for two years despite 78 families have been identified as beneficiaries.

There are a number of families who were displaced by the development of Simunye in the late 1970s and resettled at Mafucula. These families are still waiting for the assistance promised by the Government and are prime candidates for any further smallholder development.

The cost of developing and running these new irrigation schemes will be very significant, and the repayment of capital and maintenance of the systems will add to the cost of production.

E. Access to credit

Access to finance is a major obstacle to new participants in the sugar industry. The land tenure system is largely traditional and the finance system is Western- orientated. The two are incompatible as regards the security of title deeds, which are not available under traditional tenure.

The milling companies have assisted where possible, but the cost of increasing capacity has used most of their resources. Furthermore, over the last few years the mills have developed their own available land for sugar since this yields a better return on investment than lending it to other growers. Profits are generated through the milling process rather than through the growing element. Both Ubombo and Simunye have assisted with the finance of outgrower schemes, to the detriment of their own cash flow and development. Both these mills have had to put internal expansion plans on hold due to cash flow problems caused by extending credit to outgrowers.

An understanding is being reached among several lending institutions, the SIDC, the Enterprise Trust Fund and Swazi Bank. These parties have established a formalized agreement whereby a person who has been granted a quota to grow sugar cane can obtain a loan to develop their land. This is under the proviso that the grower has a letter from the mill stating that it will oversee his farming and deduct loan repayments from his sucrose income. Other lending institutions, such as high street banks, do not seem to be as cooperative.

The creation of an industry-administered development fund with the aim of assisting new small participants would be of tremendous benefit. New participants would then be able to deal with people who understand the workings of the industry and the tasks they face. The alternative is for the sugar industry to improve its links with the more conventional financial institutions so as to enable new participants to obtain finance.

Seasonal financing for crop inputs is difficult but not impossible to achieve, provided that the milling companies help by making fertilizer and herbicides available to growers at cost, when required. Fertilizer and herbicide supply companies are developing schemes to supply and apply inputs according to recommendations by their own or extension service personnel. They could also be encouraged to develop a credit system with deductions from sucrose payments. The problem with sugar cane is that the inputs for the crop are required so far in advance of harvest that the loan period is very long.

F. Infrastructure

The existing cane-growing areas have a very well-developed infrastructure, which in most cases is maintained by the millers or large growers at a far higher standard than the national infrastructure. The millers and growers often assume the maintenance of the national infrastructure in their specific areas. In addition, they usually develop their own infrastructure for power, telephones, water, medical and social security while assisting with commercial development.

The small growers in more remote locations are at a distinct disadvantage when it comes to availability and quality of infrastructure. Because many of the growers are in scattered developments the amount of infrastructure required is substantial and economies of scale cannot be realized.

The future expansion of small-grower sugar cane is planned for two distinct areas, which will make it possible initially to install a specifically designated infrastructure. The

maintenance of this infrastructure will need to be addressed at the development stage, as otherwise it will deteriorate, possibly detracting from the long-term viability of the projects. Unless appropriate measures are taken from the outset to ensure that maintenance is planned and provided for, services that are less essential to production are unlikely to receive maintenance attention until the cost of doing without them becomes excessive.

Canals, pumps and associated equipment require constant attention but are easy to maintain for larger-scale developments where water charges can be used for financing. Roads, drains, bridges, electricity, telephones and other services are likely to be ignored until they become critical to production or a disaster has occurred. For example, cane grown by Sidvokodovo farmers has to be hauled via Manzini because all the more direct roads are impassable for heavy trucks.

Accordingly, further development of small-scale cane growing will have to be boosted by significant support to infrastructure development. It is particularly important that the less significant elements of the infrastructure not be left out of development programmes simply in order to save costs.

The introduction of cane-growing to an area will lead to an influx of people and money. Cane-cutting is usually done by migrant workers who are relatively well paid, but the influx of this labour can cause tremendous social upheaval if the necessary services and controls are not in place. The supporting infrastructure of clinics, police, shops, bars and accommodation must therefore be developed early in the plans, particularly since serious disturbances to the normal life of an area may occur already at the start of development when people are brought in to establish the infrastructure.

G. Skill factors

The Swaziland sugar industry has done a tremendous amount over the last 30 years to develop the skills required to run the industry. This is illustrated by the fact that ethnic Swazi nationals have reached senior positions in the industry. In addition, well-trained people have been drawn from the sugar industry into all other fields of employment in the country.

There is, however, some concern about the shortage of the skills required for an expansion of small-scale sugar cane cultivation. The knowledge of how to grow sugar cane can be built relatively easily through extension services and the transfer of knowledge from people employed on the larger estates. Other skills necessary for commercial farming will require extensive development. The land identified in the major planned developments is Swazi Nation Land, currently occupied by subsistence farmers. A major objective of the development is to raise their standard of living by involving them in commercial agriculture. Most of these people have had only minimal education and are not familiar with modern business or commercial agriculture.

A characteristic of sugar cane farming is that harvesting must be done according to a schedule that ensures all growers the possibility of delivering a predetermined quantity daily, and in most cases every day, during the crushing season. The necessary discipline can lead to friction if the reasons behind it and the methods used to draw up the schedules are not

understood. The same applies to further development of irrigation, which will require an understanding of irrigation management principles and scheduling by all participants. A vast amount of skills transfer or training will also be needed to ensure that new small-grower participants in the industry do not unnecessarily go through the same "school of hard knocks" that many of the existing small growers admit to having gone through to get where they are today.

Assistance with development techniques is unlikely to be necessary, as once the land is developed the skills will not be used again. This is an area where local entrepreneurs could be assisted to establish small development companies. These companies would move on as the development proceeds.

Support is required in three main areas. First, assistance with the growing of cane from an agronomic point of view will be needed. This service is available from the SSA extension services. Second, farmers will need assistance with developing their management abilities and understanding how the industry works. This service can be supplied by training from the industry and government through the SSAES, combined with hands-on experience. Third, financial management skills are necessary: cane growers are paid only once a year, and that money has to be used to pay off the previous year's debts and provide a living until the next harvest. This requires an understanding of loan repayments and interest and will be by far the most difficult skill to develop; it will require that farmers have confidence in the integrity of their advisors and/or trainers. A few tertiary institutions in Swaziland offer courses along these lines but more will be needed, as lenders might eventually require borrowers to attend a relevant course.

A possible fourth skill could be the knowledge of how to work as a member of a cooperative or a farmers' association with responsibility for other members of the group. Problems are sometimes caused by frequent changes in group leadership and the election of people who cannot participate in English-language meetings. Cooperation is an essential skill in this respect. Mills require a regular and steady supply of cane over the whole season. This is easy for large growers who can cut a fraction of the total each day and deliver it economically. Small growers, however, deliver less than 10 tons a day each, which is uneconomical. Accordingly, farms have to be pooled, so that the crops from complete farms are delivered in an ordered sequence. Such an arrangement calls for accommodation among the farmers, for which the ability to cooperate is essential.

In conclusion, skills development and knowledge transfer will be a major requirement for the successful expansion of small-scale sugar cane cultivation.

H. Access to inputs

The necessary inputs for the industry are available in the country, or if not available can be sourced easily from South Africa without any restrictions on importation.

The millers and the larger growers have a very good source of supply for all inputs, often with several competitive sources for the same item, thus ensuring optimum price and delivery

terms. Very few of the industry requirements are sourced outside the SACU, keeping the industry relatively safe from currency fluctuations.

Smaller producers often do not have sufficient cash flow to fund purchases. The development of more "supply-and-apply" organizations with access to some form of extended credit will ease the burden on the small grower. A significant difficulty in this regard is the provision of service-type inputs, such as tractor power for field operations, harvesting and haulage, replanting and irrigation repairs.

It will be challenging for the industry to maintain and expand services to an increasing number of growers over the next 10-15 years. It is important to ensure that the small growers get their inputs at a fair price and that suppliers do not supply only the big growers while ignoring or exploiting smallholders. A good example is provided by the VFA, which in the last 10 years has developed its own source of inputs with support from its miller, Mhlume.

I. Extension services

The Sugar Act of 1967 calls for an effective agronomic extension service to monitor and enforce pest and disease controls within the industry. Demand for such services will increase as the number of growers rises.

1. Government extension services

Extension services provided by the Government through MOAC to the small sugar farmers are relatively limited in terms of manpower and effectiveness. Two extension officers are trained in sugar cane production, while a number of others are available but have no formal sugar cane knowledge. The need for the Government to provide extension services may be questioned, since the industry has a very sophisticated service of its own. An extension service needs to be in touch with issues of the day, and in this respect an industry body has a clear advantage. The Government would realize a better return on money invested by directing it through the SSA extension services and assisting the SSA to extend its services to a larger number of potential growers. This is, in effect, happening already, with the MOAC extension officers working closely with the SSAES. Nevertheless, government assistance can be useful in helping prospective sugar cane growers to acquire a foothold in the industry and develop their land. The possibility of the Government and the SSA coordinating their respective sugar extension service activities through the Association is a possibility that merits further consideration. The new farmers require assistance at all times and controls like overtime bans and lack of transport will frustrate farmers and extension officers. Furthermore, recommendations from different organizations could confuse issues if not directed through one channel.

The Government has a heavy plant operating unit and a land development unit. These units are underfinanced, and the allocation of more funds for its expansion and modernization is unlikely. Commercialization would help it to become a more accessible tool for all and provide cost benchmarks against which to monitor private contractors. The MOAC tractor

pools are in a similar state and will require assistance to become reliable and cost-effective service providers.

2. Extension services provided by the industry

The SSA operates a fully-fledged independent Extension Service — the SSAES — for the entire Swaziland sugar industry. With the cooperation of SASAEX (South African Sugar Association Experiment Station) and other training institutions it can offer virtually any service required. According to its 1997 annual report, the objectives of the Service are:

"To ensure the long-term viability of the Swaziland sugar industry by increasing yields and reducing production costs through research and improved agricultural practices."

The Extension Service has an administrative staff of 10 and 30 workers. The large estates have their own agronomy departments and liaise directly with outside organizations, so these numbers do not reflect the true numbers employed in extension work. However, staff will have to be increased greatly as the industry expands and many more small growers join the industry and require extension services.

The Extension Service has five main sections, reflecting its main activities:

- Irrigation agronomy,
- Irrigation engineering,
- Crop agronomy,
- Pest and disease monitoring, and
- Extension

Irrigation agronomy

The combined effects of several dry years; the need to use water more efficiently; and the entry into the industry of more small growers have created a need for much more information about soils, crop growth and sucrose yield relationships with irrigation applications. The SSAES has a full-time irrigation agronomist to cover this role.

Irrigation engineering

The post of irrigation engineer was created in order to assess the efficiency of existing irrigation schemes, especially those of new, small-scale growers, and to offer advice on the selection of systems and equipment to new growers.

Crop agronomy

A crop agronomist is employed to cover aspects of growing the crop, such as soils, fertilizer, ripeners and herbicides, and to monitor the performance of new varieties.

Pest and disease monitoring

The Pest and Disease Department plays an important role by ensuring a supply of disease-free parent seed material. Over the years, this has made it possible for Nco 376, the main variety in Swaziland, to be planted commercially, whereas in South Africa it has been removed from the list of approved varieties due to smut disease.

Another very important role played by the Department is the inspection of all growers' fields to ensure that disease levels are acceptable and that remedial action is implemented where required. Remedial action for fields found to have high levels of smut is a legal requirement and its enforcement is a key to the successful expansion of the industry. The monitoring of fields for pest damage is also important.

Extension

Until research or experimental findings have been implemented by the growers and have increased their profitability they are of no benefit to anybody. The involvement of research workers in extension programmes, assisting with training courses and contributing to industry seminars, meetings and publications is therefore a crucial part of the extension programme. This role will become more important as the number of small growers increases, due to their inexperience and lack of knowledge about cane-growing.

3. Other extension services

A number of suppliers of fertilizer, chemicals, fuels and lubricants, irrigation equipment and agricultural equipment offer extension services in the form of advice to customers or potential customers. These services are of great value to the industry, and hopefully the capacity to provide them will grow in line with the requirements of the small grower. The cost of these services is usually covered by the supplier.

IV. PROBABLE SOCIOECONOMIC AND ENVIRONMENTAL IMPACTS OF SMALL-SCALE SUGAR FARMING

The proposed expansion of sugar cultivation with an increase in land devoted to sugar cane of up to 18,000 hectares will have a considerable impact on the country, mostly beneficial. It is to be hoped that the negative social and environmental effects can be minimized if not avoided. The traditional rural way of life will be irrevocably changed in with the emerging opportunity to grow irrigated sugar cane, and the effect on the rural communities of the disappearance of traditional grazing lands will forever change the lifestyle of those concerned.

The Government is well aware of the likely impact of reduced grazing areas and has plans to reduce the national cattle herd as resources for it diminish. It must be realized that cattle are more than just a source of nutrition; they also supply traction power for ploughing and transport, constitute a form of insurance for farmers, and are part of the culture. While

traction and transport can be provided for by more modern means, and nutrition will improve with cash flow and development, the ready security of being able to sell an animal in the event of a crisis will be hard to replace. Elements of the culture, such as the practice of giving away cattle as lobola[4], will change over time and may eventually be lost.

A. Rural employment and incomes

Most households in the rural areas are dependent on subsistence farming, as most household members have no formal employment. Cash is obtained either through the sale of surplus livestock or crops, or through funds received from family members working in the urban areas. The traditional way of life for these people will change forever with the arrival of cane-growing, but not necessarily for the better in terms of traditional values and culture.

Before any development can take place land will have to be reallocated, homesteads and in some cases graves relocated, food sources found, new grazing lands found and/or livestock numbers reduced. The effect of this turmoil on the communities will be covered by the EIA report before an environmental licence is issued. The stress placed on the rural communities should not be underestimated, and one precondition of the development of an area should be that every household to be affected must be able to anticipate being better off after the project than before its implementation. To remain in the same status as before is not satisfactory. Even those with no right or interest in land should benefit in some way from the arrival of the project. For instance, the current situation of some of the families displaced by the Government 20 years ago when Simunye was created is unacceptable.

The nature of employment will be changed in many of the communities. Depending on the size of the farms, people may either be working their own land or working for others as labourers. As skills develop, there will be opportunities for people to start their own support service industries. The introduction of sugar cane will make substantial differences to the cash flow in the area concerned. At current sucrose prices, one hectare of cane is projected to generate in the region of E 16,000 per year. If it is assumed that half of that represents input costs (a figure of 45 per cent was quoted for smallscale farmers), additional cash income will be E 8,000 for every hectare planted. Whilst not providing a substantial income to the very small farmer, it will significantly boost the family income. Subsistence farmers rely on cattle as an emergency fund. If cattle are replaced by cane fields then the income generated from sugar will have to be high enough to raise the standard of living to a point where cattle as a reserve fund are not required.

The development of the new sugar cane areas will substantially increase local employment opportunities, both in farming and in ancillary industries providing services and goods to the farms and their employees. There is tremendous scope for entrepreneurs to start small support services, such as cutting teams, haulage, tractor services, spraying, weeding, road maintenance and input supply. The opportunity for educated children to return home

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[4] Lobola is known in other parts of the world as "bride price". Men are required to pay the bride's family. The payment usually includes cattle.

from urban areas will enhance family life, as they will be able to find gainful employment as clerks, teachers, drivers and bookkeepers.

B. Land use and land ownership

The Government recognizes the problems of land ownership as a constraint on development. Both the NDS's Twenty-Five Year Vision (1997-2022) and the ESRA 1999-2001 plans recognize this.

One of the NDS recommendations reads: "*Develop a land allocation policy that will ensure that both men and women have equal access and ownership opportunities especially on Swazi Nation Land*".

The NDS also states: *"Review and update the Land Speculation Control Act of 1972 to promote development projects, minimize the requirements for land transactions and encourage investment and credit availability"; "Formulate an effective mechanism for settling land disputes on Swazi Nation Land"; and.*
"Explore possibilities of improving the present land tenure system".

Land use will change dramatically as small subsistence fields and the occasional dryland maize or cotton field surrounded by communal grazing lands ise converted to irrigated fields, leaving some some area of maize or vegetables. The winter grazing lands for cattle on the richer alluvial soils along the riverbanks will disappear, as will large amounts of summer grazing around the fields. It should be noted that the situation with regard to cattle in Swaziland is already of concern. Overgrazing is degrading the environment, and it is estimated that there are 100,000 head in excess of what can be sustained on the land area, or 20 per cent more than the country's grazing capacity.

The ownership of land is unlikely to change, since most of the land designated for small-grower development is traditional Swazi Nation Land. This land is controlled by the local chief on behalf of the King. No title deeds are issued to anybody for this land, and the use of any particular piece of land is authorized by the Chief under traditional law. As discussed above, collateral for loans can be obtained from understanding parties without the security of title deeds. The cooperation and involvement of the local chief is essential for the success of any scheme within his area. Thus it is important that the chiefs support development activities. Future fields or development blocks should be defined where possible by the chieftainship boundaries in order to minimize the potential for conflict.

Cattle and land are important to Swazi culture, and true recognition of their significance must be accommodated in the development of any area so as to prevent conflict in the later stages. Examples exist of ignored parties irrigating roads to prevent haulage trucks from collecting harvested cane, or of people sabotaging irrigation equipment.

C. Other agricultural production

The land designated for development of sugar cane could in principle be used for other crops. However, at present the economics of the projects dictate that sugar is the only crop where the return can justify the cost of development.

The land designated for sugar cane development is not really being put to significant use for other crops at present. It is assumed that small areas of the land to be irrigated will be set aside for gardens and food crops. However, some of the new small growers report that where areas have been set aside for gardens and subsistence crops they can buy more food with the money generated by sugar cane than they could grow on these areas. The subsistence areas being taken over are millet gardens and dryland cotton fields.

Food security is of concern to the Government, and there are plans to develop highveld areas for irrigated maize production. The land identified for cane does not currently produce a significant quantity of commercial crops, except dryland cotton. Given the low returns on cotton farming, these farmers will be only too happy to find other sources of income. The foreign exchange earned by sugar will enable maize security to be achieved from imports at a far lower cost than by developing marginal areas to maize. The main maize-growing areas of Nhlangano in the south and Matsamo in the north are too cold in winter for cane to be grown. The exception is the Siteki plateau, which grows good maize in a normal or wet year but does not have sufficient water for irrigation to develop a substantial cane area.

D. The scope for mixed cropping

Sugar cane is a perennial crop with huge volumes of organic matter. In the normal sequence of events there are no fallow periods and therefore no opportunity to grow any other crops. The intercropping of other crops with sugar cane has been tried by the commercial estates and was found to depress cane yields. The exception was green manure crops grown over a summer fallow period where the cane is ploughed out at the end of one season and not replanted until early the following season.

According to a paper presented at a recent South African Sugar Technologists Congress, trials had shown that, on a small scale, a substantial increase in household income could be generated by intercropping sugar cane with cabbages or green maize, provided they were harvested within 120 days. The cane yield was slightly reduced, but the loss was more than compensated for by the cash earned from the sale of the other crops. More work is being done on this topic which could be of interest to Swaziland in future.

On the larger estates, cane lands for replanting are the first to be harvested and then ploughed out. A three-month fallow period is required to kill the old cane, diseases such as RSD, and Smut-infected stools. In order to maximize the next harvest the crop must be planted as soon as possible. The cane needs to germinate and canopy before the high summer temperatures arrive, causing stalk elongation rather than tillering, and before the summer rains, which lower soil temperatures and suppress cane germination. It is also important that the cane have maximum leaf area in order to intercept solar radiation in the late summer

months. Late planted cane is at a considerable disadvantage, and yields are severely depressed in cane that has not canopied before the end of November. Cane yields are severely depressed by late planting, not least through the competition from weeds in the summer months. These can affect the crop unless full canopy is achieved by the summer months of maximum solar radiation. Planting in summer (from November to March) should be avoided unless the crop can be carried over to harvest in May the following year. In a normal year the ideal planting deadline is the end of September.

A typical timetable is as follows:

- Harvest by mid-May;
- Plough out by end of May;
- Fallow, and land preparation, in June, July, August; and
- Plant in September, October.

All planting is still done by hand with varying degrees of mechanization to distribute the seed canes, apply fertilizer, and cover with soil. Planting can use up to 20 man-days/hectare. This means there is considerable pressure to replant large areas in time.

By-products of cane, such as the tops and trash, can support other agricultural activities - for instance, feedlots. There are many examples of secondary activities based on sugar cane. In Mauritius there are several feedlots that run on cane by-products, including at least one dairy. Cane tops and bagasse are not ideal cattle foods, since their nutritional value is less than the energy required to digest them. As supplementary cattle food with no additives, however, they can be used in drought periods to reduce the rate of malnutrition or starvation among livestock.

In the Far East cane tops and bagasse are key ingredients of the feed mix for the famous Kobe Beef so popular in Japan. This exploits the harshness of the fibre in the cane, which actually damages the animals' stomach lining. The animals then supplement the damaged surface area of the digestive system to absorb sufficient food. Once the animal has grown sufficiently, the cane is removed from the diet and the digestive system recovers. It is then able to absorb far more food than required, resulting in a very rapid phase of growth that leads to the build-up of soft muscle with plenty of marbled fat and a good outer fat layer.

All commercial cane grown in Swaziland is burnt before harvest. This removes most of the leaves and makes it easier for the manual cutters or the combine to cut and handle the cane. The trash that is burnt is equal to about 40 per cent of the weight of the cane, which could possibly have been used for other purposes. How long burning will be considered environmentally acceptable remains to be seen.

Simunye earlier had a fully integrated diversification operation, which has recently been downsized and outsourced to allow the company to concentrate resources on the core business. There is ample opportunity for others to start similar operations sourcing inputs from the growers and mills. The activities at Simunye included a beef feedlot, pig farming, ostrich farming, an animal feed business and an alcohol distillery. The alcohol distillery also

produces stillage, which has crop nutritional value, now supplemented with fertilizer and applied to cane lands by contractors.

E. Water availability

The single most important physical constraint on the further expansion of the sugar industry is water availability. As discussed earlier, there are plans to build two new dams in order to catch excess summer river flow. Work has started on Maguga dam on the Komati River, and impounding is due to start in March 2001. The second dam, Bovane on the Usutu River, awaits the EIA report and is not expected to begin impounding water until the summer of 2003/2004.

The development of water resources is the key to all agricultural expansion in Swaziland. The Government has plans to put significant areas of the country under irrigated production, some of which would be for cane. There are plans to take water from the Mkhondo River, channel it south for maize-growing and drop it eventually into the Ingwavuma River. The water would then be taken from the Ingwavuma and run south from Nsoko towards Lavumisa to develop the lands between the Lubombo mountains on the east and the hills towards Hluti on the west.

The international water agreement between South Africa, Mozambique and Swaziland needs to be ratified, and problems with water in the Komati and Usuthu rivers not being released into Swaziland need to be addressed. The requirement that 40 per cent of the flow in the Umbuluzi and Usuthu rivers must be released to Mozambique results in this water largely going to waste in the sea at Maputo Bay. This problem should also be addressed.

The Komati and Usuthu rivers rise in the highlands of eastern South Africa and flow east to Swaziland. The base flow of these rivers should be allowed to pass into Swaziland and on to South Africa and Mozambique. However, these rivers have been heavily dammed in South Africa and very little base flow comes into Swaziland. This causes problems for Swaziland, especially on the Komati, which re-enters South Africa in the north and is heavily used by the cane growers in the Mpumulanga province of that country before it enters Mozambique. This causes major friction between growers in the two countries.

It is interesting to note that in the 1950s Huletts (now Tongaat-Hulett, a South African sugar company) looked at building a sugar factory on the site of the present Komati mill. It did not do so as water was not available for irrigation. Some 30 years later the mill has been built and is suffering from water shortages. Huletts developed the Mhlume mill, as that was where the water could be extracted.

Water management and development are areas where international assistance could be utilized for the implementation of the new Water Act, once it is passed. This would be important especially for establishing measuring stations and for the control of water usage from the rivers outside of the main irrigation zones.

F. Soil quality

Murdock[5] and others have mapped Swaziland and its soils on a general basis. The Land Use Planning Section of the MOAC has comprehensive records of the soils' potential in most areas of the country. Detailed mapping of potential areas of development is required as a part of feasibility and EIA studies.

Swaziland soils are derived from the weathering of the pre-Cambrian granites and schists, often heavily metamorphosed. These have been overlaid in places by more recent alluvial material in the ancient river valleys and by soils derived from the igneous intrusion of basalt forming the Lubombo Mountains. The basalt is the parent material of good deep red soils, hence the further one moves away from the Lubombo Mountains the more mixed the soil types become.

There is an adequate amount of suitable and good soils available for the proposed expansions in the Komati and Usuthu basins. A lot of the soils are, however, unsuitable and will require careful management if they are to be used for any irrigated crop. Some are totally unsuitable and should not be cultivated.

Other areas of good deep soils suitable for sugar cane cultivation can be found in Swaziland. However, in some cases, it will be impossible ever to bring water for irrigation to the areas concerned. Other areas, such as the Malkerns and lower Ezulwini valleys, could be developed if and when more water becomes available. All the main river valleys have large areas of good soil which are not irrigated at present but which could be developed at some future date, in some cases as individual farm projects. Others would require major construction works before development.

While soil is certainly not a constraint on the expansion of the sugar industry, the location of good soils must be taken into account when siting irrigation canals and fields.

V. REVIEW OF THE SUGAR ACT OF 1967

A. Overview

The Sugar Act itself consists of only 16 paragraphs. Paragraphs 3 and 5 establish the Swaziland Sugar Association and define its functions:

" There is hereby established a body corporate, to be known as the Swaziland Sugar Association, which shall be capable of suing and being sued in its corporate name and of performing all such acts as are prescribed from time to time in its constitution and as are necessary for, or incidental to, the carrying out of its functions under the Agreement and under this Act." (paragraph 3)

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[5] G.Murdock, soil scientist who mapped most areas of Swaziland for the colonial Government and is often called on as a consultant by the Swaziland Government.

" The functions of the association under this Act are to regulate the sugar industry in terms of the agreement; and to advise the Minister on any matters relating to the sugar industry." (paragraph 5)

The Swaziland Sugar Industry Agreement is introduced in paragraph 6, which states:

"The Agreement ... shall be binding upon all millers, growers, miller-cum-planters, refiners, and any other persons engaged in any aspect of the sugar industry."

Paragraph 7 states:

"Notwithstanding anything contained in the Agreement, a purported alteration or amendment of any clauses of the Agreement specified in Part II of the Schedule shall be of no effect unless it is made with the prior written consent of the Minister." (Here and elsewhere, "the Minister" refers to the Minister of Commerce, Industry and Mines.)

Paragraph 8 establishes the Quota Board and paragraph 11 establishes that no person may grow sugar cane or manufacture or refine sugar except holders of a licence allocated in terms of the Agreement (the Minister may, however, on the advice of the Association, grant permission to refine sugar). Moreover, only the SSA may import or export sugar (again, the Minister may, on the request of the Association, grant permission to import or export sugar).

Paragraph 12 gives the Minister the right, after consultation with the SSA, to prescribe maximum wholesale or retail prices.

The Swaziland Sugar Industry Agreement is annexed to the Sugar Act and provides implementation regulations for it. Millers and growers are parties to the Agreement. As already mentioned, changes to sections in the Agreement specified in Schedule II require the prior consent of the Minister.

Chapter II of the Agreement establishes the SSA, the constitution of which is annexed to the Agreement.

Chapter III defines the functions and composition of the Quota Board. The Board has 10 members, three of whom are nominated by the Minister and the rest by millers and growers, with the Chairman nominated by the SSA and approved by the Minister.

Chapter IV provides details of the quota system. In a situation where the limiting factor for production has been the capacity of mills to handle the cane, the distribution of quotas is of course of vital interest to producers. Rules concerning the allocation of quotas reflect a desire to allocate the right to produce in as equitable a manner as possible, taking into account past performance. When milling capacity increases, more flexibility can be exercised, and this is reflected in the rules concerning increased or new quotas. Specifically, these rules state that the SSA may at its discretion decide that increased quotas will be offered to existing growers and/or that new quotas will be offered to new entrants by the Quota Board, provided that it is satisfied:

(a) That the future available markets for sugar produced in Swaziland ought to be adequate to accommodate at satisfactory prices the further expansion of production which will result from the granting of the increased quotas; and

(b) That milling capacity to accommodate the extra production resulting from such increased quotas is available or will be made available by the millers at the mills" (article 15(1)).

Before increasing the quota of any existing grower or granting a new quota, "the Quota Board shall first satisfy itself that the applicant for the increase or new quota has available to him suitable land and an adequate water supply" (article 15(3)).

The quota is attached to the land and a particular mill. The written consent of the Quota Board is necessary for the transfer of the quota to a new owner or from one mill to another (article 18).

Chapter V defines the functions of the Mill Group Committees, one for each mill. Each such Committee consists of an equal number of representatives of the mill and of the growers attached to the mill. The chapter provides details concerning the preparation of delivery schedules, distribution of shortfalls and other matters of common concern to the mill and the growers.

Chapter VI deals with the sale and delivery of cane, and marketing and disposal of sugar. Specifically, it states that "All sugar produced by millers and all refined sugar produced by refiners shall be marketed and disposed of only by the Sugar Association, save and to the extent the Association may provide otherwise" (Article 42). The chapter also defines the basis for pricing of sugar cane and payment procedures.

Chapter VII deals with by-products, which are in principle marketed freely. Chapter VIII describes the financing of industry obligations, arbitration procedures and procedures for nominations and appointments.

B. The Sugar Act and the Swaziland Sugar Industry Agreement

The Swaziland sugar industry is the country's most important economic sector. It is one of the most efficient and lowest-cost sugar producers in the world. This is very largely due to the work done in the mid-1960s by the industry's founders, who put a tremendous amount of effort and travel into researching the world sugar industry. The Government has deemed it appropriate neither to leave the development of the sector to market forces alone, nor to subject it to detailed government regulation. Instead, it has opted for giving broad self-regulating powers to the industry itself through the Sugar Act and the Agreement. The experience to date has been very favourable. The Swazi sugar sector has benefited from the cooperation and mutual understanding between the Government and the industry represented by the SSA. Any decision to change the relationship should therefore not be taken lightly and must be in the best interests of the Swazi nation as a whole. While the Sugar Act leaves a large amount of discretion to the SSA with respect to the practical measures used, it is of

course in the interest of the industry that the trust placed in it by the Government be discharged in a responsible manner and that, consequently, the SSA carry out its tasks in a way that is consistent with the Government's development objectives.

The crucial factor determining whether the present system is likely to continue working in the interest of the country's economy as a whole is its adaptability to change, specifically its ability to accommodate new entrants to the industry.

In the last few years, changes have occurred in the industry. Some of these changes may give rise to concerns about where the control of the industry lies. The Swazi people have always been proud of their historical independence from South Africa, going back to the fact that the Zulu King Shaka never controlled the Swazi people. Accordingly, the recent purchases of Ubombo by the South African sugar company Illovo and of Tambankulu Estates by another South African sugar company, Tongaat-Hulett, raises the question of the extent of foreign-based companies' influence over the industry. This question also has to be asked against the background of the millers-cum-planters having gained control of more cane land, either through development or through the acquisition of other growers. The fact that millers and growers both have equal representation in the policy-making bodies of the industry, and the fact that the majority position of the industry is held by Swazi institutions, should both serve to balance foreign ownership. In order to assuage concerns about foreign influence, it is nevertheless important for the procedures of industry bodies to be transparent and seen to reflect the interests of Swazi participants, particularly the smaller growers.

The expansion of cane-growing over the last few years has entailed the entry of new growers in areas where sugar cane was not grown previously. The perceived success of these growers has encouraged others to seek opportunities to enter the sugar sector. In many cases, however, the prospective entrants have been handicapped by lack of finance or other factors. It is important that the obstacles to entry be reduced in order to counter the impression that the sugar sector is not open to smaller farmers and trading enterprises.

The industry is now embarked on a steady expansion. If all development plans are realized, an additional 20,000 hectares could be developed for sugar cane over the next 15 years.

It is the Government's objective to ensure that this expansion is to the benefit of as many citizens as possible and that it facilitates the establishment of infrastructure contributing to further development of the country, even if in the future it becomes uneconomical to grow cane. Should this happen, the development carried out will make it possible to use the land for other crops.

As regards new entrants into sugar cane-growing, the planned expansion of both irrigation and milling facilities would appear to make it possible to accommodate new small-scale cane farmers without any prejudice to existing growers. Accordingly, there would appear to be no need to amend the present legislation to achieve this objective, particularly since representatives of the SSA have declared the Association's willingness to accord priority to small-scale farmers in the context of allocation of new quotas. It could of course be questioned whether there is a need to retain the quota system, in view of the planned expansion. However, the quota system has uses, even in a situation where all cane produced

could be absorbed by the mills and by the market. Most important of these uses is that the system gives the SSA the power to enforce quality controls and measures related to the control of plant diseases.

As mentioned earlier, all the sugar produced by millers and all the refined sugar produced by refiners is marketed by the Sugar Association. The Association does, however, allocate quantities of sugar at discounted prices to independent entrepreneurs for sale. The mills cannot sell sugar directly to consumers. Discussions appeared to indicate some dissatisfaction with the present state of affairs. Small traders who would want to distribute sugar for retail consider that they are not given an opportunity to do so. On the other hand, it is a fact that some traders who have been allocated sugar for resale and have proved unable to take up their allocations due to lack of capital are attempting to sell their allocations. It would obviously not be in the interest of either consumers or the long-term health of the industry if a system of artificial and unnecessary rationing were to evolve. The industry has undertaken a review of marketing operations through the Gill Lavers[6] report, which was confidentially shown to the consultant. According to the report, the present single-channel marketing has been cost-effective. The sugar industry is in the process of compiling a strategic marketing plan as recommended by the report.

C. Other Acts

The current income tax law exempts those who derive a living from activities on SNL from income taxes. The reason for this provision is that, historically, those who live on those lands tend to be low- income subsistence farmers who would in any case normally fall below the income tax threshold. Their entry into commercial sugar cane farming could, however, increase their income to such an extent that they would normally be expected to pay income tax. Accordingly, in order to avoid a situation where sugar cane farmers are taxed differently depending on the legal status of the land they occupy, measures could be considered which would ensure that all commercial activities on SNL are subject to income tax. Such measures should be seen as all the more equitable, given the large investments in infrastructure that will be necessary to make small-scale sugar cane-growing viable, and the interest in having all the beneficiaries contribute to the cost of these investments. While collection of the tax could prove problematic in some cases, there are ways of ensuring that the tax is paid, at least on cane-growing, by levying it directly on payments from the mills to growers and entrusting the millers with collecting the tax on the Government's behalf.

A large portion, approximately 38 per cent of the sugar production, is sold to preferential markets at premium prices. Since the premium prices are seen as indirect assistance to the development of the country, the Government has imposed a sugar export levy on protocol sales to the European Union. Since fiscal year 1996/1997, this levy has been fixed at a rate of 5.75 per cent of the ex-mill value of such sales two years earlier. It could be argued that a priority use of the proceeds of the levy should be the development of the sugar sector itself, including infrastructural investment.

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[6] Gill Lavers is a sugar marketing consultant who was retained by the SSA to review its marketing activities.

VI. RECOMMENDATIONS

In addition to specific recommendations presented below, several other observations deserve to be made:

A review of the Sugar Act and its application by the SSA shows that the Act in its present form does not constitute an obstacle to the entry of small-scale farmers into sugar cane-growing. These farmers are eligible to receive a quota provided they have access to land and water. The quota obliges the farmers to deliver the cane to a designated mill that has the capacity to crush it. The sum of the quotas is based on what the SSA can sell in any year. At present, allocated quotas do not fully meet the capacity of the mills. Hence, and taking into account planned expansions in milling capacity, it should be possible to increase production by smallholders.

It would appear unnecessary to change the power of the Minister to set the maximum prices of sugar. While the maximum price is rarely applied in urban areas, it can be used as a tool to prevent the exploitation of remote rural communities.

A. Recommendations to the Government

1. Present land tenure policies and legislation should be reviewed with a view to facilitate commercial farming on Swazi Nation Land, as stated in the National Development Strategy.

The NDS recognizes land tenure as an obstacle to development and as a problem that needs to be addressed to make it possible for communally owned land to be used as collateral for loans. Reforms aimed at facilitating commercial farming should take into account the need not to damage the social structure of rural society.

2. The Government should review ways of providing loan guarantees for small-scale sugar farmers.

Since reforms of the land tenure system may take considerable time and may not solve all the problems, other ways of providing guarantees for loans taken by small-scale sugar farmers should also be investigated.

3. Measures, including legislation, should be considered to ensure that farmers' associations and farmers' cooperatives are legally constituted under the cooperatives legislation.

There are several examples of groups having registered under the simpler procedures of the Protection of Names, Uniforms and Badges Act. In such cases, the Department of Cooperatives is unable to assist in resolving disputes or problems with loan repayments. The

Department is legally required to monitor the activities of cooperative societies and to ensure that they maintain proper records and operate under a constitution.

4. Existing legislation to ensure maintenance of the standards for growing sugar cane needs to be amended so as to make it enforceable. Those who endanger the viability of the industry by flouting the plant protection laws and the mill group rules should be obliged to comply or prevented from endangering the viability of other growers.

An amendment to the Sugar Agreement that will enable a mill to refuse cane from a grower who does not comply with a plough-out order is awaiting publication in the Official Gazette. Hopefully this will enable the industry to control the problem. Small Swazi growers emphasized several times to the MOEE representative who assisted with this report that something had to be done to control one particular grower who was not abiding by plough-out orders.

5. The situation with regard to the taxability of income from commercial farming on Swazi Nation Land should be clarified.

In principle, income taxes should be levied on commercial farming activities regardless of where they are carried out. It is expected that this subject will be addressed in the context of the ongoing review of the Income Tax Act.

6. The Ministry of Agriculture should consider the possibility of monitoring yields. Any field that fails to meet an agreed minimum reference yield should be investigated on the grounds of wasting a national resource.

The development of the Komati and lower Usuthu basins for irrigated agriculture is going to use a lot of scarce Government resources and must therefore be made to benefit the nation as a whole. Land, water and milling capacity are all resources which, if not utilized at the time, are wasted and cannot be recovered for use later. The Government cannot afford to allow resources to be wasted when so much will have been spent to enable them to be utilized by developing supporting infrastructure.

7. The purpose and use of the sugar export levy should be reviewed by the Government in association with the SSA, with particular attention to the usefulness of earmarking the levy for projects aimed at developing the sugar sector.

Possible suggestions for use of the sugar levy proceeds include the financing of development projects such as the new bridges over the Komati and Usuthu rivers or the financing of tax incentives to attract businesses processing sugar in the country.

8. The establishment of a development fund, administered by the industry and aimed at assisting new small-scale participants, should be considered.

Such a fund would place new entrants to the industry in a situation where they would receive assistance and advice from people understanding the workings of the industry and the tasks they face.

9. The Government should convene a meeting with all concerned parties including the SSA to draw up an inventory of services and assistance required for eventual submission to international donors.

B. Recommendations to the industry

10. Preference to enter the industry should continue to be given to new small growers or associations of small growers.

It is recommended that any new grower applying for a sucrose quota of up to 200 tons, or any association applying for quotas of up to 200 tons of sucrose per member with land, be granted the quota automatically, provided they meet the land and water requirements. Only if it is clear that the total of all quotas desired by small-scale growers is less than the total available should consideration be given to applications from larger growers. Any exceptions should be subject to approval by the Minister on the understanding that preference would in such cases be given to applications that are considered to be in the national interest. The figure of 200 tons of sucrose corresponds to the threshold for small growers applied by the SSA, as when allocating production cuts, from which small growers are exempted.

11. To the extent that availability of land develops into a constraint on the expansion of small-scale cane-growing, millers-cum-planters and other major growers should consider ways of divesting some of their land to allow new, smaller growers to join the industry.

This measure would ensure that more experienced individuals requiring less assistance would be able to enter the industry. The experienced professional managers currently employed by the companies are not going to be persuaded to resign and take on a farm that will not give them at least the same, if not a higher, standard of living than they have at present. The entry of such managers into the industry should be encouraged. The measure would also stimulate the industry by allowing the younger employees who have little chance of promotion until a senior man retires to develop their careers without having to leave or be lost to the industry.

12. The SSA should consider ways to continue to ensure that new and existing small growers receive the required amount and type of extension services in order for them to contribute fully to the industry. The cost of this is likely to put an unfair burden on existing growers if it were to be funded from a straight levy.

The requirements of a greatly enlarged small-grower population were discussed with the SSA, which is fully aware of the magnitude of the problem and is prepared to expand its extension services in order to handle the new growers' requirements. The investment cost of such an expansion will place a heavy burden on the industry and should if possible be

financed by an external donor. Additional operating costs could be funded by the introduction of a special levy by SSA and/or by using a portion of the export sugar levy (without increasing the rate, which is already considered burdensome).

13. The SSA should consider new ways of explaining its functions and activities to the public.

An extensive advertising campaign in Swaziland calls sugar "the real Swazi Gold". The expression refers to the size of the industry and its contribution to the national economy. It appears, however, that the campaign has been the cause of many misunderstandings and may inadvertently have given the impression that the sugar industry is extremely lucrative, is making money hand over fist and is exploiting the country. Hence the misconceived desire by some parties with insufficient technical skills and capital to join the industry. It is nevertheless important that the general public be aware of the contribution that the sugar sector makes to Swaziland's economy, and new ways of explaining its importance and how it works should be investigated.

C. Recommendations for external assistance

Considerable amounts of external assistance will be required over the next 10 years to develop the sugar industry if the small grower is to play his rightful role. The following recommendations are directed at external providers of technical and financial assistance.

14. Grants and/or loans should be provided to finance the entry of small-scale farmers into sugar cane-growing.

Access to finance has been identified as one of the largest constraints to small-scale farmer entry into sugar cane growing. Since many of the new sugar farmers are likely to grow sugar on Swazi Nation Land, where land cannot be used as collateral for loans, there is a need for innovative financing techniques. Some lending agencies provide financing against a guarantee from the mill concerned that it will act as agent to advise and make all sucrose payments to the lender, who then deducts loan repayments before passing on the balance to the grower.

It costs around E 20,000 to develop a hectare from bush to cane, including irrigation equipment and associated equipment. At peak development on both river systems it is likely that 1,600 hectares a year will be planted. If it is assumed that 1,600 hectares per year can be developed by smallholders, an investment of E 20,000 per hectare and a four-year payback period implies a financing need of E 80 million (US$ 13.5 million).

Since it is unlikely that the mills can carry the entire risk of loans to small growers, there is a need for a specialized facility, for instance, a Small Grower Development Fund, which could operate within the parameters required with a view to developing SNL. The opportunity exists for a funding agency to develop a specialized finance project that could contribute significantly to the progress of the Swazi people. Such a fund could be developed in

cooperation with the SSA to ensure that it is used for the purposes intended and not diverted to other projects.

15. Improved training needs to be provided to both trainers and growers, particularly in all aspects of cane growing and in such support services as bookkeeping, money management, loan applications and loan administration.

16. Funding is needed for small and medium enterprises providing support services to sugar cane growers, including machinery pools, haulage contractors, land developers, farming contractors and management services.

Expansion of sugar cultivation and outsourcing by existing growers and mills provide opportunities for new entrepreneurs. However, these entrepreneurs usually require assistance to establish their businesses. Many small projects could be developed to meet these requirements, from direct grants of equipment to voluntary service organization/Peace Corps-type services working at the grassroots level.

17. The extension services of both the Ministry of Agriculture and the Sugar Association need assistance in order to cope with the increased number of recipients.

There may be a need in particular for training extension officers outside the country.

18. Assistance will be needed with the establishment of secondary industries using by-products of the sugar industry, such as feedlots and pig farms, as well as with support to non-cane growers, including tractor maintenance facilities, cooperative ranching and improved grazing.

19. Assistance will be needed with infrastructure development projects, both in new cane-growing areas and with modernization and rehabilitation of infrastructure in areas where cane is already grown.

Infrastructure projects will be developed through the appropriate development authorities (the Swaziland Komati Project Enterprise and the lower Usuthu River Basin Agency, once it is formed), which will source finance through their own offices. These projects include road rehabilitation or tarring, bridge repairs or replacement, the construction of more direct routes to the mills, dam construction and similar services.

ANNEXES

I. TERMS OF REFERENCE

A. Objectives

The objectives of the study are to:

- Review the role of sugar in Swaziland's economy and the scope for expansion and development of the sugar industry;

- Review the effectiveness of the Sugar Act of 1967 with respect to development of the sugar industry, including its effects on production, domestic and international trade and marketing and pricing;

- Assess the role of stakeholders including, in particular, small-scale farmers, in sugar production and trade;

- Identify constraints to expansion of production and participation in the industry by small-scale sugar farmers; and

- Propose measures to eliminate or reduce these constraints, including international assistance.

B. Contents

The study will comprise the following:

1. Brief overview of developments in the international sugar economy, including the existence of and planned changes to tariff and non-tariff measures

2. Overview of the sugar sector in Swaziland (production, processing, marketing and pricing arrangements) and its contribution to the country's economic development

3. Review of the participation of the various stakeholders (farmers, millers, traders) in the sugar industry and identification of the constraints to improved participation by the stakeholders, particularly small farmers, including the following aspects:
- legal and institutional arrangements for growing, processing and marketing;
- land ownership;
- access to water, particularly for irrigation-based cultivation;
- access to credit;
- infrastructure;
- skills factors;
- access to necessary inputs; and

- scope and quality of extension services provided by the Government and other institutions

4. Discussion of the probable socioeconomic and environmental effects of increased small- scale sugar farming, including effects on rural employment and incomes, land use and land ownership, other agricultural production, the scope for mixed cropping, water availability and soil quality

5. Detailed review of the Sugar Act of 1967, including:

- the effectiveness of the Act in facilitating domestic trade and exports of sugar and its compatibility with international trading rules;
- the appropriateness of arrangements for sugar production contained in the Act; and
- the impact of the Act on marketing and pricing of sugar in Swaziland

6. Recommendations for government policies and actions with a view to improving the contribution of the sugar industry to the country's economy and alleviating the constraints to increased participation, particularly by smallholders, including recommendations on:

- the role of government in the industry;
- changes in the 1967 Sugar Act;
- provision of extension services;
- administration of irrigation schemes;
- rural credit facilities;
- training;
- risk management and fiscal arrangements;
- arrangements for consultation with small-scale farmers and rural communities; and
- need for international technical and financial assistance

II. TERMS OF REFERENCE FOR A POSSIBLE BROADENED STUDY OF THE SWAZILAND SUGAR SECTOR

A. Introduction and background

1. The production and milling of sugar cane is Swaziland's largest industrial sector, accounting for approximately two thirds of the value of agricultural production, one quarter of GDP, and one third of export earnings. At least 10 per cent of the total population is supported by incomes derived principally from the sugar sector. The industry makes a major contribution to government revenue.

2. The sugar industry is controlled by the Sugar Act of 1967, which created and gave wide powers to the Swaziland Sugar Association (SSA). The functions, powers and duties of the SSA are set out in the Swaziland Sugar Industry Agreement, contained in a Schedule to the Act. The SSA is an association of cane growers and sugar millers which regulates the industry, promotes its interests, and is responsible for all processing, conditioning, bagging and marketing beyond the point at which raw sugar is produced at the mill. In addition, millers and growers have their own associations. The latter is also a statutory creation, under the Swaziland Cane Growers' Act No. 12 of 1967.

3. Within the past decade the environment in which the sugar industry operates has witnessed significant changes. Further significant developments are expected to take place during the next decade. The sugar industry is experiencing changes locally, regionally and internationally. First of all, SSA has recently concluded an industry agreement with the SASA on market access within the SACU. This agreement was acknowledged by both the South African and Swazi Governments. Secondly, the implementation of the SADC Trade Protocol over the next decade will further liberalize trade within the region. It is anticipated that trade in sugar will be governed by a separate protocol. Thirdly, although the ACP-EU Sugar Protocol has an indefinite lifespan and is independent of the Lomé Convention, the EU has indicated its wish to renegotiate it. However, the benefits of the Protocol which are related to the annually determined preferential price may well be reduced. Fourthly, the forthcoming agricultural round at the WTO is scheduled to start towards the end of 1999.

4. It is to be recognized that there are severe distortions in the form of tariff and non-tariff barriers facing world sugar markets. These distortions result in world market prices which are unrelated to production costs.

5. One objective of the consultancy is to review the regulatory environment of the sugar industry in Swaziland, taking into account, *inter alia:*

- The importance of maximizing the sustainable growth and development of the sugar industry within Swaziland;

- The recent changes in the SACU market for sugar, particularly the SASA/SSA industry agreement on the marketing of sugar within the SACU;

- The proposed introduction of the SADC Trade Protocol, which will establish a Free Trade Area within eight years from the date of implementation;

- The possible reform of the sugar regime within the European Union; and

- The rules of the World Trade Organization and possible reforms during the "Millennium Round" of negotiations scheduled to commence in 2000[update.

6. The study will recommend to Government an appropriate sugar policy, taking account of the regulatory framework required to achieve that policy, with the objective of maximizing the future economic benefits to Swaziland arising from its comparative advantage in sugar production; taking into account both existing contractual obligations and possible changes in the local, regional and international markets for sugar.

B. **Specific tasks**

The consultant(s) will cover the following tasks:

1. Review previous reports/studies on the sugar industry in Swaziland. It is envisaged this would include the study entitled *Prospects for Swaziland's Sugar Industry in SACU* by M. Westlake (1995).

2. Prepare a brief summary of the structure, size and contribution of the Swaziland sugar sector to the economy.

3. Undertake a brief overview of the main developments in the local, regional and international sugar economy.

4. Review the existing legal and institutional arrangement for growing, processing and marketing sugar. It is envisaged this will include a detailed review of the economic efficiency of the current regulatory system in facilitating the efficient production of sugar within Swaziland, as well as the need for the regulations to be compatible with current international rules. It is expected that the consultants will examine and review, *inter alia*, the following:

- Operation of the quota for growing sugar
- Control of production
- Current import and export regulations
- Single channel marketing
- Setting of the domestic price for sugar
- The mechanism for setting cane prices

- Allocation of by-products and residues from the milling operations
- Regulation of milling licences

The consultants will also review with reference to other relevant studies the increasing role of small-scale cane-growing in the industry. In doing so, the following aspects could be considered, *inter alia:*

- Legal and institutional arrangements for growing, processing and marketing
- Land ownership
- Access to water, particularly for irrigation-based cultivation
- Access to credit
- Infrastructure
- Managerial and operational skills
- Access to necessary inputs
- Scope and quality of extension services provided by government, SSA and other agencies
- Socioeconomic and environmental effects of increased small-scale sugar farming
- Risk management

6. Based on the analysis of the current regulatory situation, the consultants will prepare a series of proposed reforms/amendments. The consultants will discuss the arguments for and against the proposed amendments and in each case draw attention to the implications of the proposed changes or failure to change on the different interest groups within the industry. For the purposes of the study, the interest groups may be defined as:

- The economy of Swaziland
- The sugar millers
- Large-scale cane growers
- Small-scale cane growers
- Employees on the sugar estates
- Sugar-using industries in Swaziland
- Major sugar-consuming interests

7. The consultants will be based within the Ministry of Enterprise and Employment and will work in close co-operation with government officials concerned with the sugar sector. It is expected that a Steering Committee comprising representatives of the Ministries of Agriculture and Cooperatives, Economic Planning and Development, Finance, Foreign Affairs and Trade, the Attorney General's Chambers and the Swaziland Sugar Association will be established. The consultants will also be expected to work closely with all themajor interest groups within the sugar industry, including:

- The Swaziland Sugar Association
- The Swaziland Cane Growers Association
- The three major sugar milling companies: Ubombo Sugar, Royal Swaziland Sugar Corporation and Mhlume Sugar Company
- Tibiyo Taka Ngwane
- Major sugar trading and consumer interests

C. Consulting requirements, indicative timeframe and budget

The project is expected to require approximately four man-months' input. The consultants will need to possess a combination of skills, including knowledge of the sugar sector, experience in the analysis of agricultural marketing arrangements and regulatory economics, and experience in legal drafting. In addition, it is expected that all the consultants will possess excellent communications skills, combining sensitivity and authority, and to have experience in working with senior officials and business people.

An indicative budget of E 500,000 will be required.

III. PERSONS CONTACTED

		Date of first meeting (1999)
Government:		
Hon. R. Fanourakis:	Minister of Agriculture and Cooperatives	24 June
C. Kunene:	Principal Secretary, MOEE	25 May
S.A. Pato:	Chief Commercial Officer, MOEE	25 May
N. Nkambule:	Principal Secretary, MOAC	26 May
S. Dlamini:	Agricultural Economist, MOAC	26 May
D. Lukele:	Director, Komati Development Authority	27 May
K. Msibi:	Water Control Officer, Dept of Water Affairs	15 June
W. Dlamini:	Land Use Planning Officer, MOAC	15 June
S.S. Dlamini:	Senior Agricultural Economist, MOAC	15 June
Mr. Masango:	Provincial Extension Officer, Lubombo, MOAC	15 June
Mr. Sukati:	Extension Officer, MOAC	15 June
W. Ginindza:	Commissioner for Cooperatives, MOAC	24 June
Industry:		
P. de Beer:	Financial Manager, SSA.	26 May
Dr. M. Matsebula:	Chief Executive Officer, SSA	15 June
H. James:	Corporate Affairs Manager, Ubombo Sugar	15 June
Z.M. Nkosi:	Executive Director, SCGA.	15 June
J. Bezuidenhout:	Production Manager - Outgrowers, Ubombo Sugar	16 June
D. Black:	Managing Director, Swazi Trac Ltd.	16 June
M Boast:	Managing Director. Simunye Sugar	17 June
P. Hughes:	Managing Director, Tambankulu Estates	17 June
T. Lupton:	Managing Director, Msco.	17 June
G. Ffoulkes Roberts:	Financial Manager, Msco.	17 June
T. Gothan:	Business Development Manager, Msco.	17 June
P. Scott:	Manager, Mhlume Water	17 June
A. Mathonsi:	Managing Director, VFA	18 June
P. Arnot:	General Manager, VIF Ld.	18 June
H. Rostron:	Manager, SSA Extension Services	22 June
R. Ellis:	Agronomist, Simunye Sugar	22 June
D. Msibi:	Credit Analyst, Enterprise Trust Fund	24 June
S. Ndwandwe:	Agricultural Loans Officer, Enterprise Trust Fund	24 June
B. Dungate:	Managing Director, Swazi Bank	24 June
P. McEnery:	Asst. General Manager, Credit Swazi Bank	24 June

IV. FAO SUGAR STATISTICS 1998

	Country/territory	Sugar Cane Production (Million tons)	Sugar Cane Area (hectares)	Sugar Cane Yield (tons cane/hectare)
	World	1,254,290,730	19,708,241	63.64
1	Brazil	339,117,000	4,990,390	67.95
2	India	265,000,000	3,960,000	66.92
3	China	85,665,800	1,201,200	71.32
4	Pakistan	53,105,000	1,137,500	46.69
5	Mexico	48,895,260	615,000	79.50
6	Thailand	47,099,300	930,000	50.64
7	Cuba	41,300,000	1,244,500	33.19
8	Australia	41,044,000	409,000	100.35
9	Colombia	32,000,000	397,515	80.50
10	United States	28,303,000	378,000	74.88
11	Indonesia	27,500,000	385,000	71.43
12	Philippines	27,000,000	392,720	68.75
13	South Africa	24,639,620	428,000	57.57
14	Argentina	19,400,000	270,000	71.85
15	Guatemala	18,189,380	180,000	101.05
16	Egypt	13,850,000	125,000	110.80
17	Viet Nam	11,428,200	251,100	45.51
18	Bangladesh	7,378,710	175,000	42.16
19	Peru	7,100,000	61,587	115.28
20	Sudan	5,850,000	75,000	78.00
21	Mauritius	5,800,000	73,000	79.45
22	Venezuela	5,786,055	117,000	49.45
23	Dominican Republic	5,066,976	150,000	33.78
24	Kenya	4,900,000	58,000	84.48
25	Zimbabwe	4,863,000	43,000	113.09
26	Ecuador	4,800,000	70,000	68.57
27	Fiji	4,559,090	73,980	61.63
28	El Salvador	4,500,000	64,000	70.31
29	Bolivia	4,241,310	94,000	45.12
30	Myanmar	4,124,920	83,983	49.12
31	Swaziland	3,885,574	39,000	99.63
32	Nicaragua	3,842,540	52,920	72.61
33	Costa Rica	3,620,000	40,000	90.50
34	Honduras	3,580,045	36,000	99.45
35	Paraguay	2,800,000	58,000	48.28
36	Guyana	2,600,000	44,000	59.09
37	Jamaica	2,413,380	40,407	59.73
38	Madagascar	2,180,000	67,000	32.54

	Country/territory	Sugar Cane Production (Million tons)	Sugar Cane Area (hectares)	Sugar Cane Yield (tons cane/hectare)
39	Panama	2,032,668	32,720	62.12
40	Réunion	1,950,000	26,000	75.00
41	Iran, Islamic Rep. of	1,880,000	26,000	72.31
42	Nepal	1,762,580	48,000	36.72
43	Malawi	1,750,000	17,500	100.00
44	Ethiopia	1,650,000	16,000	103.13
45	Zambia	1,650,000	15,000	110.00
46	Malaysia	1,600,000	23,500	68.09
47	Uganda	1,550,000	120,000	12.92
48	Japan	1,430,000	22,500	63.56
49	Trinidad and Tobago	1,404,080	26,000	54.00
50	Sri Lanka	1,382,220	24,842	55.64
51	Cameroon	1,350,000	135,000	10.00
52	Congo, Democratic Republic of	1,300,000	31,000	41.94
53	Belize	1,254,820	26,000	48.26
54	Morocco	1,250,000	16,300	76.69
55	Haiti	1,200,000	30,000	40.00
56	Côte d'Ivoire	1,155,000	17,000	67.94
57	Tanzania, United Republic of	1,060,000	11,000	96.36
58	Senegal	885,000	8,100	109.26
59	Guadeloupe	638,000	12,300	51.87
60	Nigeria	620,000	21,000	29.52
61	Barbados	570,872	8,949	63.79
62	Congo	470,000	28,000	16.79
63	Burkina Faso	400,000	4,000	100.00
64	Papua New Guinea	395,000	7,300	54.11
65	Angola	330,000	9,000	36.67
66	Chad	330,000	3,500	94.29
67	Puerto Rico	307,358	10,219	30.08
68	Mozambique	300,000	25,000	12.00
69	Mali	284,638	4,009	71.00
70	Saint Kitts and Nevis	244,398	3,500	69.83
71	Liberia	235,000	23,000	10.22
72	Guinea	220,000	4,300	51.16
73	Somalia	190,000	6,000	31.67
74	Martinique	189,000	2,650	71.32
75	Gabon	173,000	3,000	57.67
76	Cambodia	171,305	7,022	24.40
77	Spain	165,000	2,000	82.50
78	Uruguay	160,000	3,800	42.11
79	Niger	145,000	5,500	26.36
80	Burundi	137,000	1,600	85.63

	Country/territory	Sugar Cane Production (Million tons)	Sugar Cane Area (hectares)	Sugar Cane Yield (tons cane/hectare)
81	Ghana	110,000	4,000	27.50
82	Laos	98,000	3,200	30.63
83	Suriname	84,500	2,200	38.41
84	Central African Republic	80,000	8,000	10.00
85	Iraq	70,000	3,050	22.95
86	Bahamas	55,000	1,900	28.95
87	Benin	40,931	1,054	38.83
88	Afghanistan	38,000	2,000	19.00
89	Saint Vincent and the Grenadines	25,000	1,000	25.00
90	Sierra Leone	21,000	300	70.00
91	Bhutan	12,800	410	31.22
92	Cape Verde	12,500	800	15.63
93	Rwanda	10,000	500	20.00
94	Grenada	6,500	130	50.00
95	Guinea-Bissau	5,500	200	27.50
96	French Guyana	4,912	70	70.17
97	Dominica	4,600	210	21.90
98	Lebanon	4,450	200	22.25
99	Portugal	4,000	50	80.00
100	French Polynesia	2,800	40	70.00
101	Syrian Arab Republic	55	1	55.00
102	Wallis and Futuna Is.	20	1	20.00
103	Samoa	13	1	13.00
104	American Samoa	10	11	0.91